JVC

SERVICE MANUAL

MODEL A-X5

STEREO INTEGRATED AMPLIFIER

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Warning:
When replacing the parts maked with ⚠ , be sure to use the designated parts to ensure safety.

1. Features

- Super A power amplifier
  Class A 70 W + 70 W (20 Hz – 20 kHz, 0.005 %, 8 Ω both channels)
- DC servo equalization amplifier for both MC and MM cartridges
- 2 amplifier configuration throughout from the phono input to output
- Direct power supply system with emphasis on power
- Extra high operability thanks to the non-clearance volume knobs employed

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2. Specifications

Overall Specifications

Output Power (TUNER, AUX, TAPE → SP. OUT)	: 70 watts per channel min. RMS (both channels driven, into 8 ohms from 20 Hz to 20 kHz with no more than 0.005 % THD) 73 watts per channel min. RMS (both channels driven, into 8 ohms at 1 kHz)
Total Harmonic Distortion (TUNER, AUX, TAPE → SP. OUT)	: 0.005 % at rated output, from 20 Hz to 20 kHz, 8 ohms 0.0008 % at rated output 1 kHz, 8 ohms (Measured by HP-IB AUDIO ANALYZER SYSTEM) 0.02 % at rated output, from 20 Hz to 50 kHz, 8 ohms
Intermodulation Distortion (TUNER, AUX, TAPE → SP. OUT)	: 0.004 % at rated output, 8 ohms
Power Band Width (TUNER, AUX, TAPE → SP. OUT)	: 5 Hz – 70 kHz (IHF, both channels driven, 8 ohms, 0.02 % THD)
Frequency Response (TUNER, AUX, TAPE → SP. OUT)	: DC – 100 kHz $^{+0}_{-3}$ dB
Damping Factor	: 75 (1 kHz, 8 ohms)
Input Sensitivity/Impedance	
Phono–1, 2 (MM)	: 2.5 mV/47 k ohms
Phono–1, 2 (MC)	: 200 μV/100 ohms
TUNER, AUX, TAPE	: 200 mV/47 k ohms
Signal-to-Noise Ratio	
Phono–1, 2 (MM)	: 85 dB (IHF, A net, short circuit), 82 dB (new IHF)
Phono–1, 2 (MC)	: 69 dB (IHF, A net, short circuit), 75 dB (new IHF)
TUNER, AUX, TAPE	: 110 dB (IHF, A net, short circuit), 85 dB (new IHF)
Tone Controls	
BASS	: ±8 dB (100 Hz)
TREBLE	: ±8 dB (10 kHz)
Muting	: -20 dB

Phono Equalizer Section (Phono → REC. OUT)

Phono Overload	
Phono–1, 2 (MM)	: 250 mV at 1 kHz, 0.005 % THD
Phono–1, 2 (MC)	: 18 mV at 1 kHz, 0.005 % THD
RIAA Phono Equalization (MM)	: ±0.2 dB (20 Hz – 20 kHz)
RIAA Phono Equalization (MC)	: ±0.3 dB (20 Hz – 20 kHz)
EQ Subsonic Filter	: -6 dB/Oct. (18 Hz)
Total Harmonic Distortion	
Phono–1, 2 (MM)	: 0.005 % at 10 V output, 20 Hz – 20 kHz
Phono–1, 2 (MC)	: 0.02 % at 10 V output, 20 Hz – 20 kHz
Rec. Output/Impedance	: 200 mV/680 ohms
Dimensions	: 5-1/2"(H) x 17-3/4"(W) x 16-11/16"(D) (13.9 cm(H) x 45.0 cm(W) x 42.3 cm(D)
Weight	: 25.4 lbs (11.5 kg)
Power Source and Power Consumption	:

Areas	Line Voltage & Frequency	Power Consumption
U.S.A.	AC 120 V, 60 Hz	290 W
CANADA	AC 120 V, 60 Hz	384 VA
EUROPE U.K. & AUSTRALIA	AC 110/120/220/240 V∿ Selectable, 50 Hz	510 W
OTHER AREAS	AC 110/120/220/240 V∿ Selectable, 50/60 Hz	510 W

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3. Removal of Top Cover and Bottom Plates

Procedure (Top Cover)

1. Remove 4 screws (Item No. 1) from the top cover (Item No. 2).
2. Remove 2 screws (Item No. 3) from the rear panel back of top cover.

Procedure (Bottom Plate)

1. Remove 7 screws (Item No. 4) from the sub bottom plate (Item No. 5).

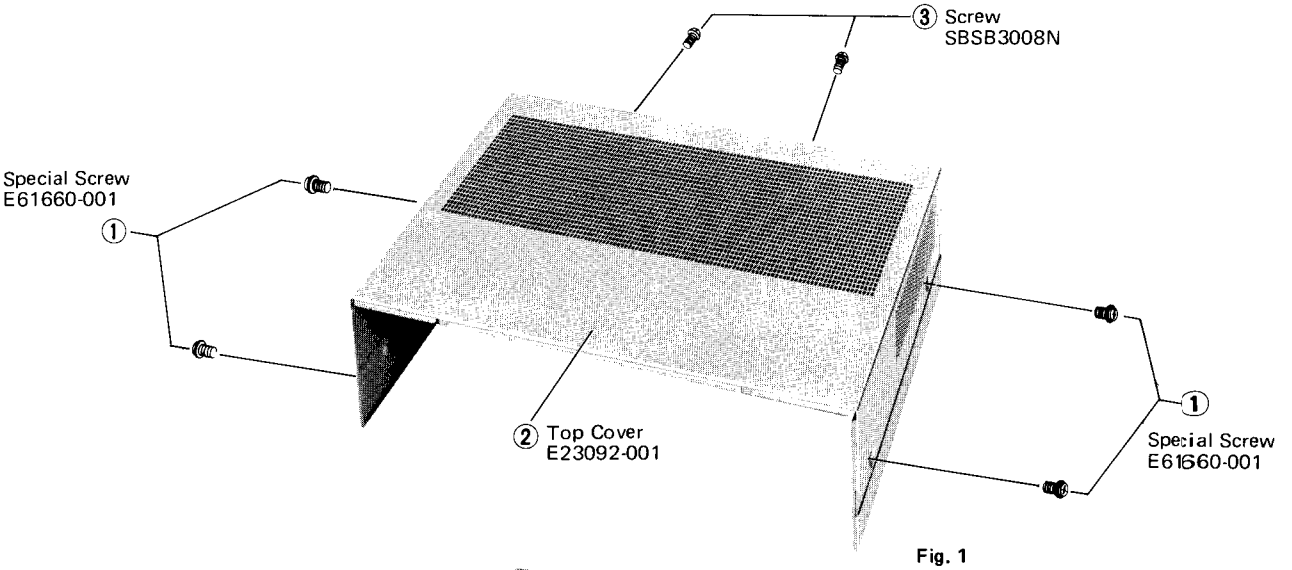

Fig. 1

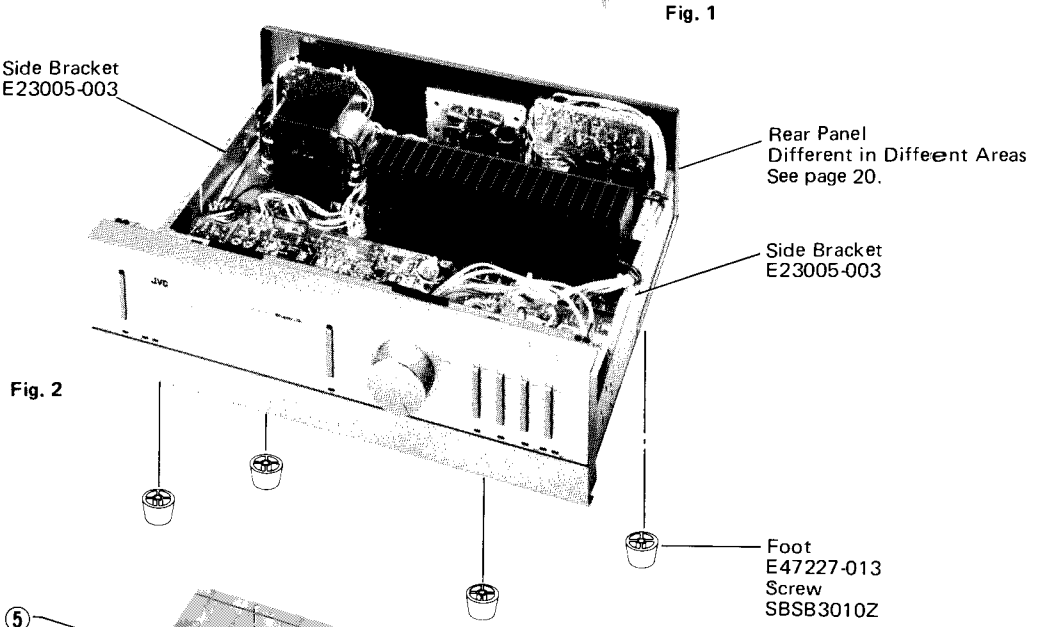

Fig. 2

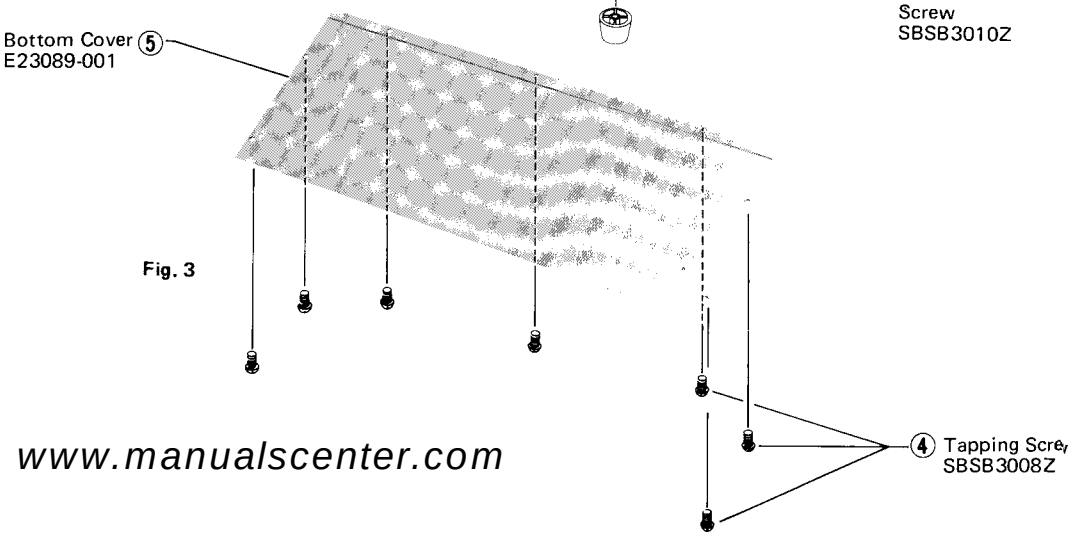

Fig. 3

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4. Main Parts Location and Part Numbers

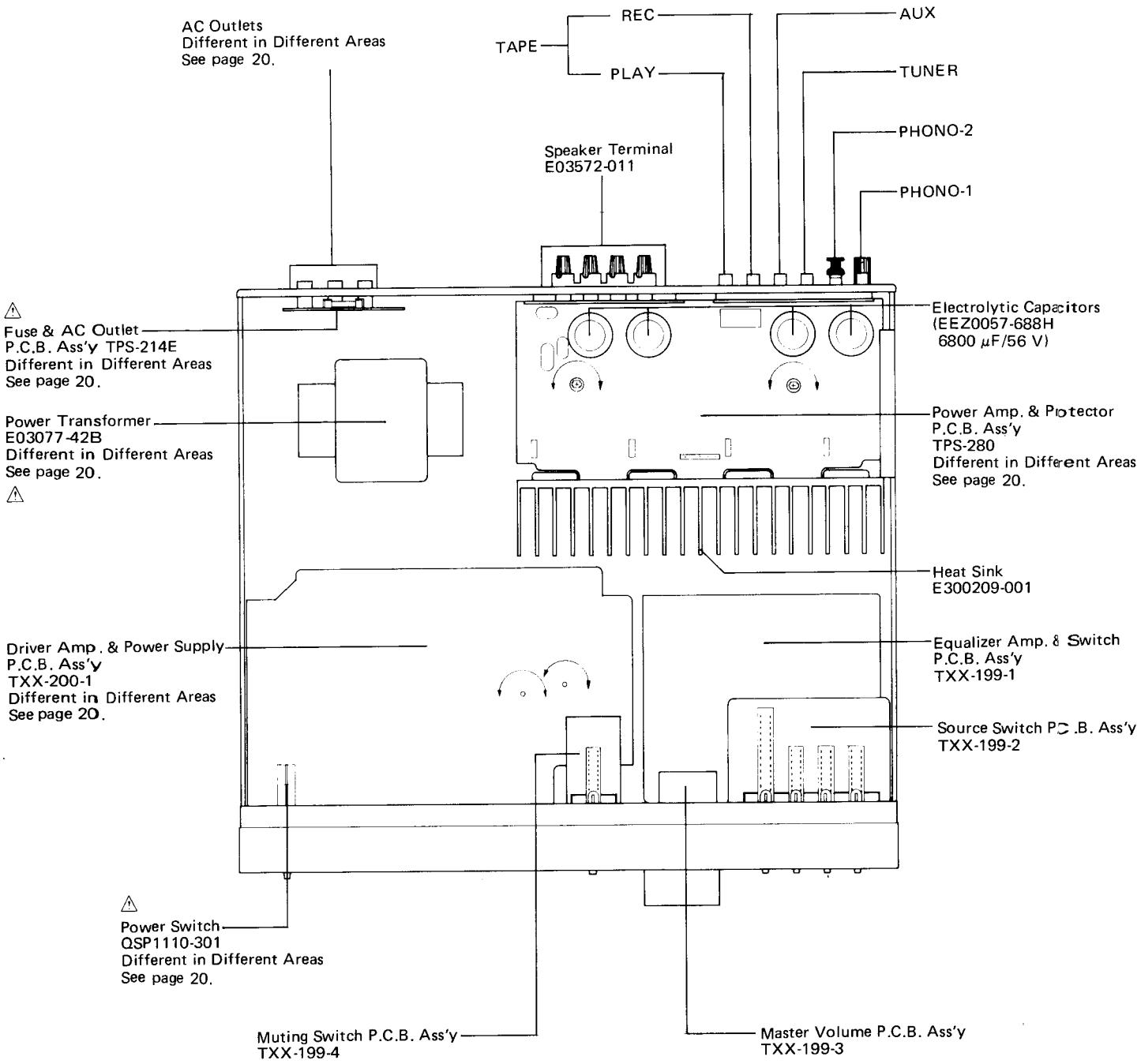

Fig. 4

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5. Exploded Views and Part Numbers

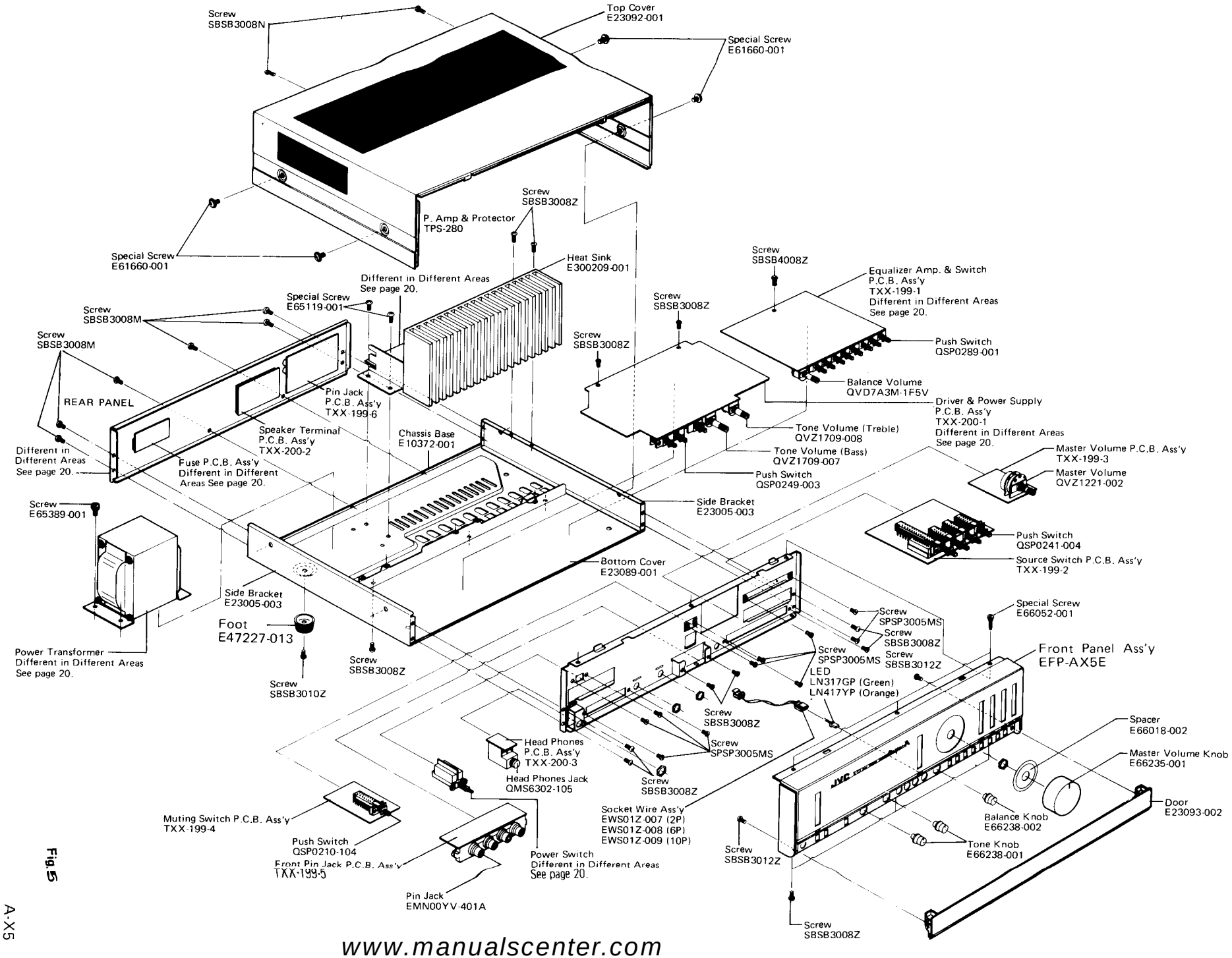

Fig.5

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6. Replacement of the Power Transistors

Pull out the sockets of transistors X503 and X504 for idling current adjustment and unsolder the 4 power transistors X535 – X538 to separate the circuit board from the heat sink. Then, replace the power transistors.

Caution: When plugging in the sockets of transistors X503 and X504 for idling current adjustment, exercise care with the polarities as shown in Fig. The collar of the socket should be forwards you when plugging it in. Reversed polarity may cause the transistors to be damaged.

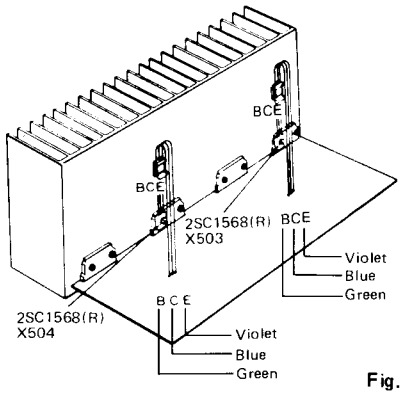

Fig. 6

7. Block Diagram

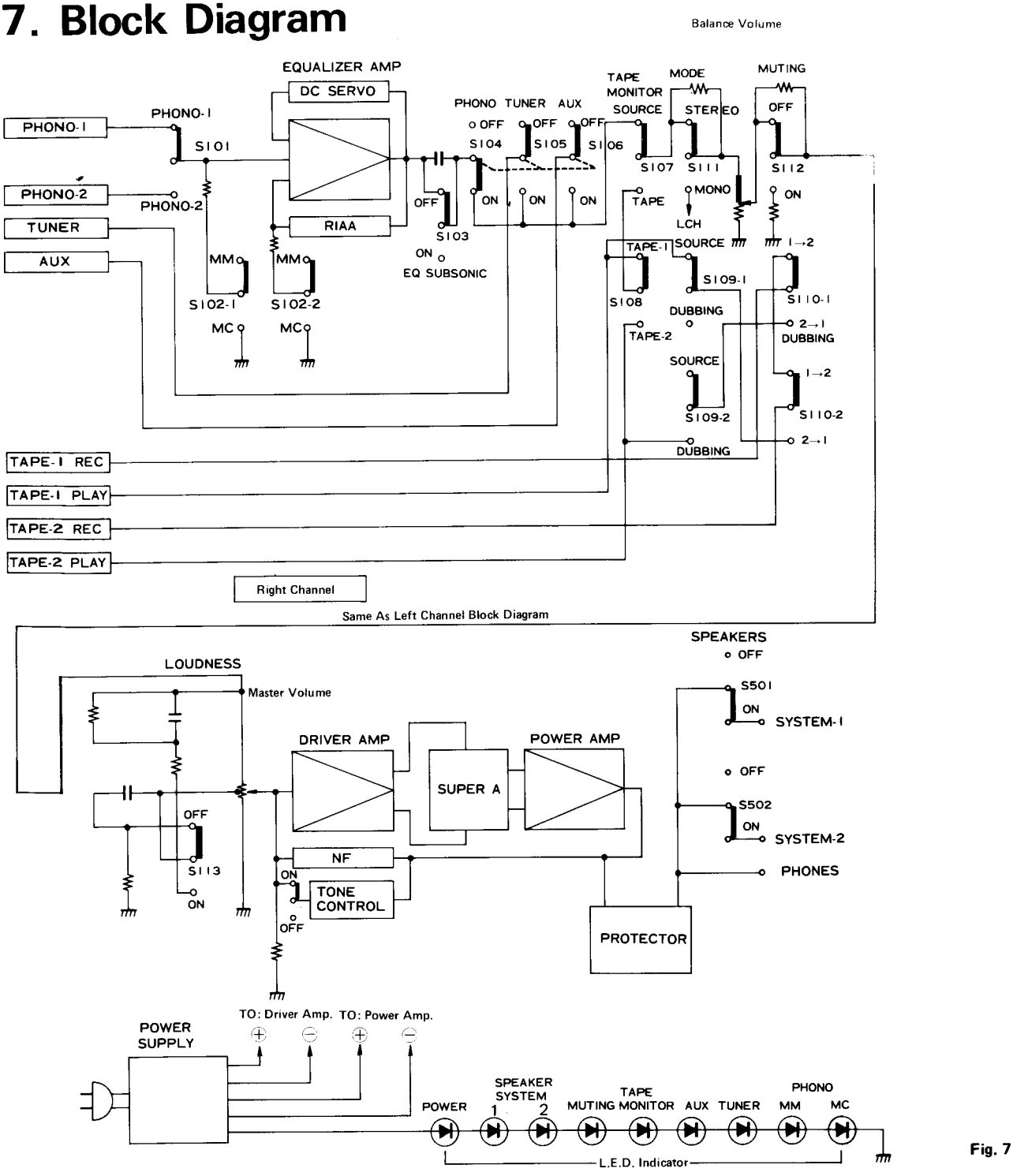

Fig. 7

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8. Technical Description

8-(1) Super A Power Amplifier

A big problem has remained unsolved in the progress regarding amplifier technology: how can class-A operation be made compatible with high power efficiency? Class-A operation is best in terms of low distortion; its critical drawback is such that its power loss is greater than the available output power. Because of this, class-B amplifiers have generally been applied for power amplification because they offer both acceptable distortion and power efficiency. However, as long as class-B amplifiers are employed, the occurrence of crossover distortion and switching distortion is inevitable. Although the improvements of circuit elements have realized fairly good class-B amplifiers, when their values of distortion are referred to, the "nature" of distortion is still detrimental to the reproduced sound quality. To solve this problem by improving circuit technology, JVC has developed its new "Super-A" power amplifier.

The Super-A power amplifier consists of a voltage amplifier stage whose distortion is minimized by compensating for the non-linearity of semiconductors, and a class-A power amplifier stage which includes a bias circuit for raising the power efficiency to a degree comparable to that of a class-B amplifier. JVC's Super-A power amplifier offers the following features:

1) Power efficiency is extremely high despite the class-A operation, greatly reducing power loss and heat generation compared with conventional class-A amplifiers.
2) Switching distortion inherent in class-B operation is completely eliminated; it is perfectly zero.
3) Δ VCE distortion *1, Δ Cob distortion *2 and Δ VBE distortion *3 are all extremely low because of the unique non-distortion circuit configuration.
   *1 Distortion caused by non-linear variations of current gain β due to variations of collector-emitter voltage VCE.
   *2 Distortion caused by non-linear variations of amplifier gain which are caused by non-linear variations of feedback capacity Cob due to variations of collector-emitter, voltage VCE.
   *3 Distortion caused by non-linear variations of base-emitter voltage VBE of the power transistor.

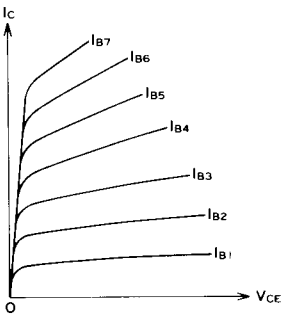
8-(2) Voltage Amplifier Stage Utilizing "Super-A" Performance to the Utmost

Fig. 8 shows operating characteristics of a common-emitter transistor; β varies as VCE varies, resulting in Δ VCE distortion as described above.

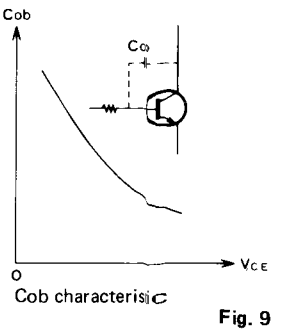
Fig. 9 shows a variation of the feedback capacity Cob in relation to VCE. This non-linear variation of Cob due to variations of VCE causes a non-linear variation of the amplifier gain, leading to the Δ Cob distortion mentioned

Fig. 10 shows operating characteristics of a common-base transistor. What is noteworthy about this type of operation is that, though its current gain is 0 dB, its output linearity in constant-current drive is fairly good since a scarcely α scarcely varies with variations of VCE ($\alpha \fallingdotseq 1$) as shown by the equal distance between adjacent base current curves.

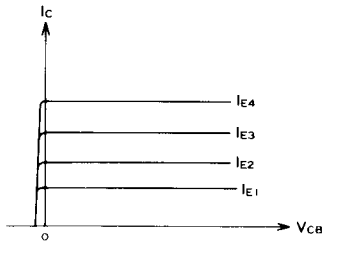
An example of the cascode-connected amplifier circuit is shown in Fig. 11. The features of this circuit are good frequency response (because of no mirror effect due to Cob) and high output impedance. This means that this circuit eliminates distortion by effectively combining the advantages of common-emitter and base-emitter configurations. The driver stage of the Super-A power amplifier employs an applied circuit of this kind and a drastic reduction in distortion is the result.



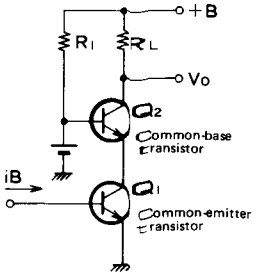
Output characteristics of common-emitter amplifier **Fig. 8**



Cob characteristic **Fig. 9**



Output characteristics of common-base amplifier **Fig. 10**



Cascode amplifier **Fig. 11**

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8-(3) Super A Type Power Amplifier Circuit

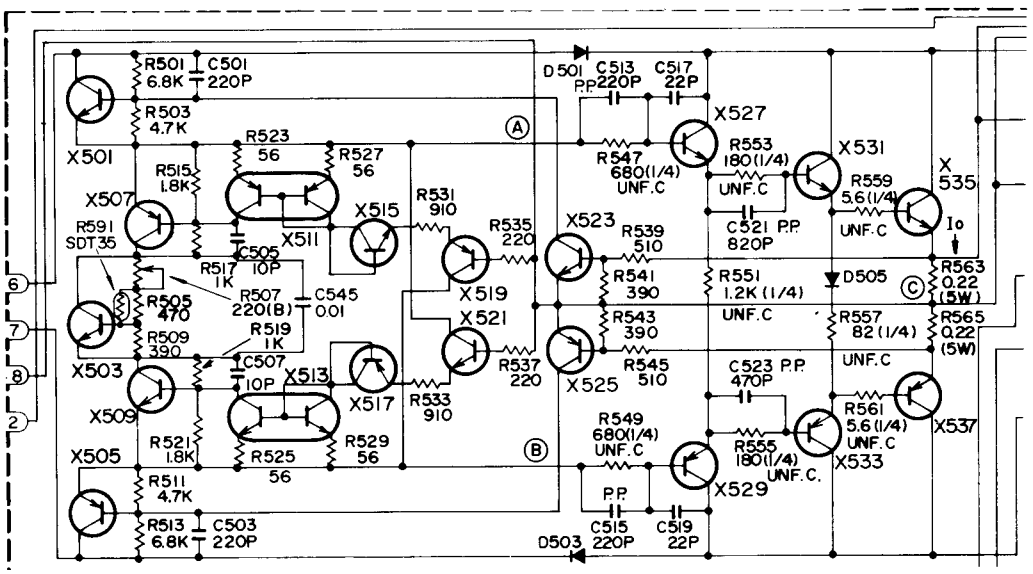

Fig. 12

X519 and X521 detect the voltage variation between A and C, B and C, caused by the output current Io. The current mirror circuit consisting of X511 and X513 controls X507 and X509 so that the power transistors in the final stage are always in class-A operation with the bias control of the circuit, and the output and input waveforms of the power amplifier stage become the same.

Because of this, class A power amplification with low distortion is obtained. The voltage between the emitters and collectors of X507, X503 and X509 is approx. 1.2 V in idling operation.

8-(4) DC Servo Type Equalization Circuit Using EL FET

(Compatible with both MM and MC cartridges)

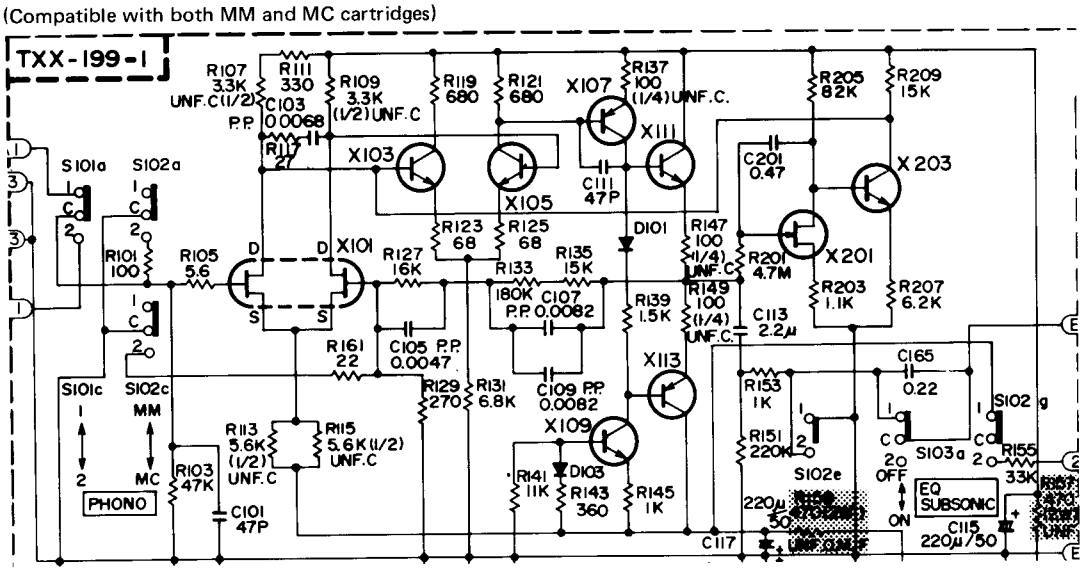

Fig. 13

In order to achieve a 2-stage amplifier with simple circuit design, an EL FET (2SK146) which was developed for the JVC EQ-7070 stereo phono equalizer is employed in the A-X5 providing a high performance DC servo equalization circuit compatible with both MM and MC cartridges.

a) Circuit design

In addition to the DC servo circuit, a 2-stage differential regulated current load DC amplifier with a collector follower plus a complementary emitter follower is used to control the offset level to 0 V.

b) High S/N

An EL FET is used as the first stage to form an ICL circuit and to make a high S/N ratio possible.

c) DC servo circuit

Increased noise at ultra low frequencies or offset point level deviation result if the equalization circuit is designed as an DC amplifier because of the extremely high gain from ultra low frequencies to DC.

The A-X5 incorporating a MC cartridge amplifier eliminates the problem with its DC servo circuit.

The DC servo circuit operates to amplify the signals with the DC servo control amplifier circuit consisting of X107 and X203, acting as a low-pass filter circuit; it prevents noise at ultra low frequencies and offset point level deviation by controlling the base current of X103.

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9. Adjustment Procedures

The letter and number following the symbol number show the location (guide scale) of the part on the schematic

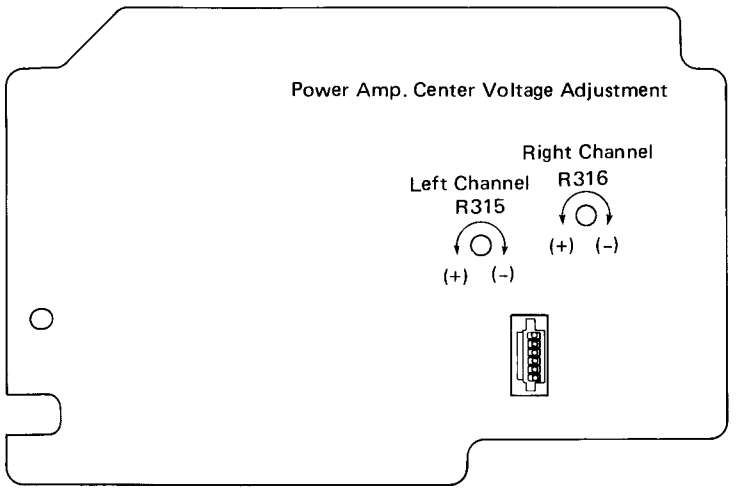

Fig. 14

Driver Amp. & Power Supply P.C.B. Ass'y (TXX-200-1)

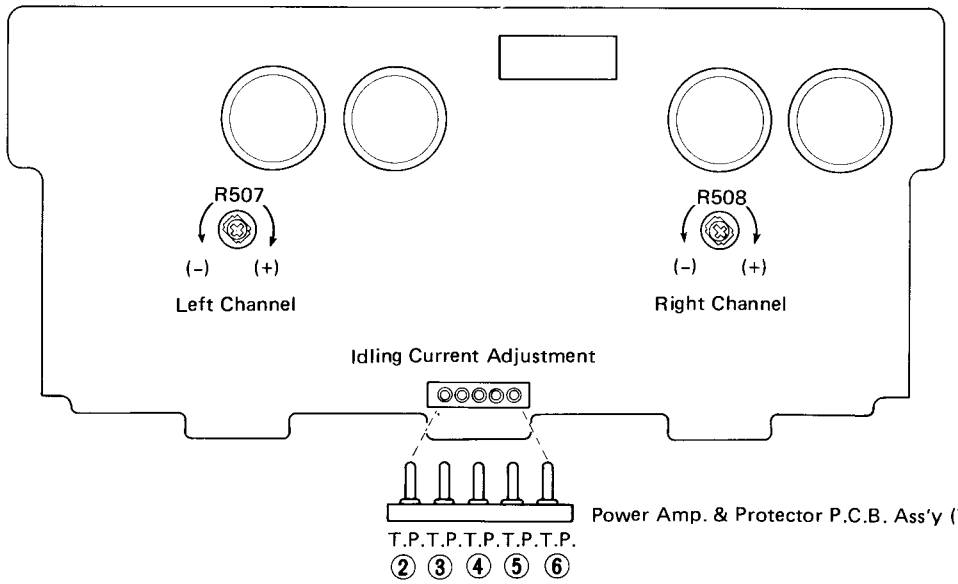

Fig. 15

Power Amp. & Protector P.C.B. Ass'y (TPS-280)

9-(1) Power Amplifier Center Voltage Adjustment

1. Before turning on the power, set the semi-fixed resistors <R315 (A.3) for L channel and R316 (A.4) for R channel> of the drive amplifier and regulated power voltage circuit boards (TXX-200-1) to the center position.
2. Adjust the semi-fixed resistors (R315 and R316) so that the voltage at the following test points of the power amplifier circuit board (TAP-280) is within a range of ±10 mV or less 5 minutes after the power is turned on.
   L channel: Measure the voltage between test point 2 and test point 4 (ground).
   R channel: Measure the voltage between test point 6 and test point 4 (ground).
   The measurements can also be performed at the speaker terminals if the relay is operating normally.

9-(2) Idling Current Adjustment

1. Before turning on the power, turn the semi-fixed resistors <R507 (C.3) for L channel and R508 (C.4) for R channel> of the power amplifier circuit board fully counter-clockwise.
2. Adjust the semi-fixed resistors (R507 and R508) so that the voltage at the following test points of the power amplifier circuit board is within a range of 10 mV – 14 mV after the power is turned on.
   L channel: Measure the voltage between test point 3 (emitter of X353) and output at the test point 2.
   R channel: Measure the voltage between test point 5 (emitter of 536) and output at the test point 6.
3. Readjust resistors R507 and R508 about 5 minutes after the power is turned on (the heat sink temperature must be sufficiently high) so that the voltage at the test points becomes 12 mV.
   Confirm that the voltage does not vary when the heat sink temperature increases further.
   Note: Be sure to perform the measurement with the probes and cabinet of the measuring equipment separated from the grounding terminals of A-X5 or of other measuring equipment.

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10. Printed Circuit Board Ass'y and Parts List

Note: (J). . .U.S.A., (C). . .Canada, (E). . .Europe, (BS). . .U.K., (A). . .Australia, (P). . .Military, (U). . .Other countries

10-(1) TXX-199B & C Equalizer Amp. & Switch P.C.B. Ass'y

Note: The number of TXX-199 varies according to the areas employed. See page 20.

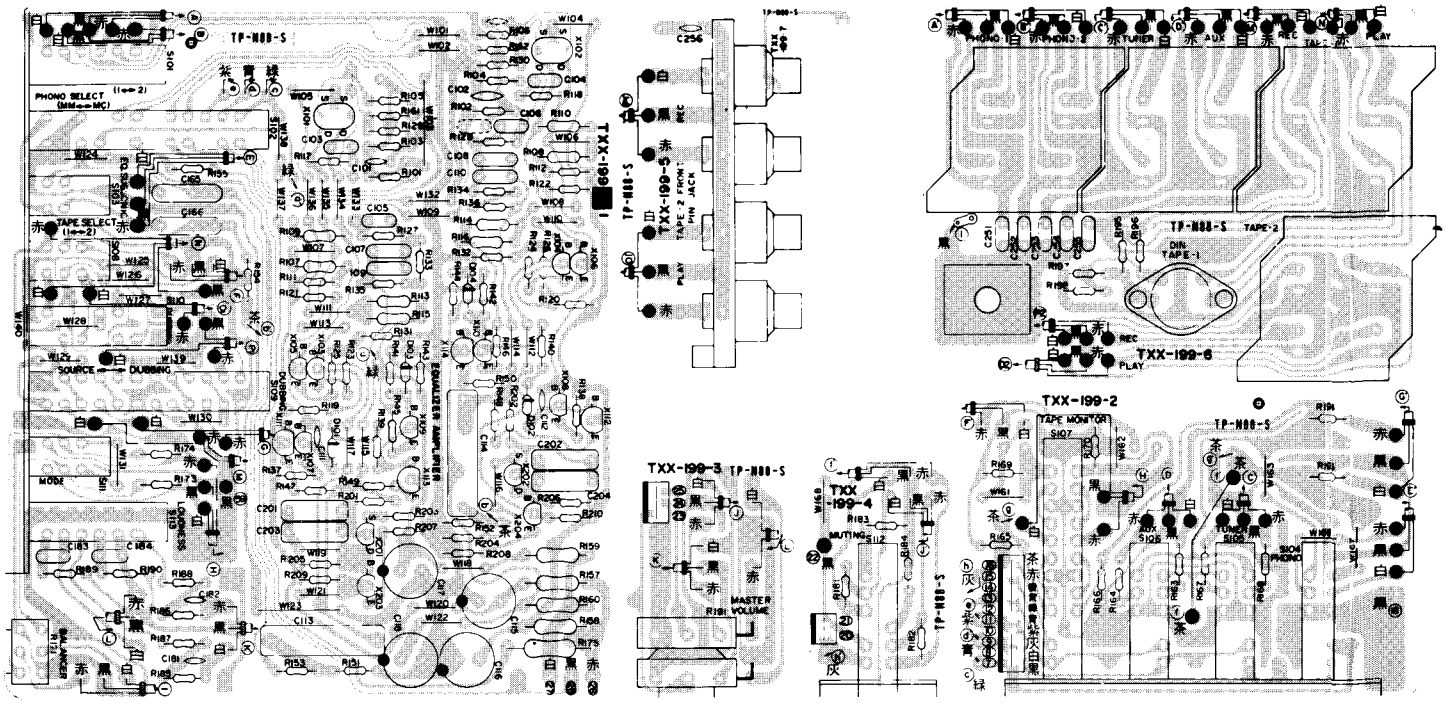
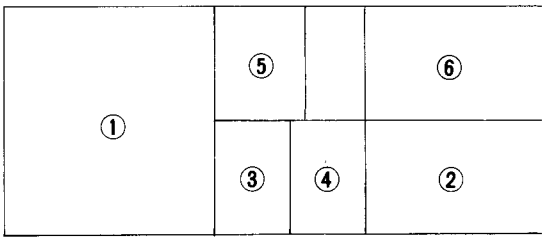


Fig. 16

Locations

① TXX-199□-1 Equalizer Amp. & Switch P.C.B. Ass'y
② TXX-199-2 Source Switch P.C.B. Ass'y
③ TXX-199-3 Master Volume P.C.B. Ass'y
④ TXX-199-4 Muting Switch P.C.B. Ass'y
⑤ TXX-199-5 Front Tape Jack P.C.B. Ass'y
⑥ TXX-199-6 Pin Jack P.C.B. Ass'y



Transistors

Item No.	Part Number	Rating		Description	
		Pc	fT		Maker
X101	2SK146	0.6 W/ unit		Silicon	Toshiba
X102	2SK146	"		"	"
X103	2SC1775AV(E, F)	0.3 W	200 MHz	"	Hitachi
X104	2SC1775AV(E, F)	"	"	"	"
X105	2SC1775AV(E, F)	"	"	"	"
X106	2SC1775AV(E, F)	"	"	"	"
X107	2SA872AV(D, E)	"	120 MHz	"	"
X108	2SA872AV(D, E)	"	"	"	"
X109	2SC1775AV(E, F)	"	200 MHz	"	"
X110	2SC1775AV(E, F)	"	"	"	"
X111	2SC2546(E)	0.4 W	90 MHz	"	"
X112	2SC2546(E)	"	"	"	"
X113	2SA1084(E)	"	"	"	"
X114	2SA1084(E)	"	"	"	"
X201	2SK68A(M)	"	"	"	NEC
X202	2SK68A(M)	"	"	"	"
X203	2SC1775AV(E, F)	0.3 W	200 MHz	"	Hitachi
X204	2SC1775AV(E, F)	"	"	"	"

Diodes

Item No.	Part Number	Rating	Description	Maer
D101	1S2076-31		Silicon	Hitchi
D102	1S2076-31		"	"
D103	1S2076-31		"	"
D104	1S2076-31		"	"

Capacitors

Item No.	Part Number	Rating		Description
C101	QCS21HJ-470	47 pF	50 V	Ceramic
C102	QCS21HJ-470	"	"	"
C103	QFM31HJ-682	6800 pF	"	Mylar
C104	QFM31HJ-682	"	"	"
C105	QFP31HG-472	4700 pF	"	Polypropylene
C106	QFP31HG-472	"	"	"
C107	QFP31HG-822	8200 pF	"	"
C108	QFP31HG-822	"	"	"
C109	QFP31HG-822	"	"	"
C110	QFP31HG-822	"	"	"

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Item No.	Part Number	Rating		Description
C111	QCS21HJ-470	47 pF	50 V	Ceramic
C112	QCS21HJ-470	"	"	"
C113	QFZ0080-225	2.2 μF	"	Film
C114	QFZ0080-225	"	"	"
C115	QET51HR-227	220 μF	"	Electrolytic
C116	QET51HR-227	"	"	"
C117	QET51HR-227	"	"	"
C118	QET51HR-227	"	"	"
C165	QFH42AK-224	0.22 μF	100 V	Metallized Mylar
C166	QFH42AK-224	"	"	"
C181	QCS21HJ-331	330 pF	50 V	Ceramic
C182	QCS21HJ-331	"	"	"
C183	QFM31HJ-273	0.027 μF	"	Mylar
C184	QFM31HJ-273	"	"	"
C201	QFH42AK-474	0.47 μF	100 V	Metallized Mylar
C202	QFH42AK-474	"	"	"
C251	QFM31HK-103	0.01 μF	50 V	Mylar
C252	QFM31HK-103	"	"	"
C253	QFM31HK-103	"	"	"

Resistors

Item No.	Part Number	Rating		Description
REAR	TXX-199-6			
R101	QRD141J-101SY	100 Ω	1/4 W	Carbon
R102	QRD141J-101SY	"	"	"
R103	QRD141J-473SY	47 kΩ	"	"
R104	QRD141J-473SY	"	"	"
R105	QRD141J-5R6SY	5.6 Ω	"	"
R106	QRD141J-5R6SY	"	"	"
R109	QRD129J-332	3.3 kΩ	1/2 W	"
R110	QRD129J-332	"	"	"
R111	QRD141J-432SY	4.3 kΩ	1/4 W	"
R112	QRD141J-432SY	"	"	"
R113	QRD129J-562	5.6 kΩ	1/2 W	"
R114	QRD129J-562	"	"	"
R115	QRD129J-562	"	"	"
R116	QRD129J-562	"	"	"
R117	QRD141J-270SY	27 Ω	1/4 W	"
R118	QRD141J-270SY	"	"	"
R119	QRD141J-681SY	680 Ω	"	"
R120	QRD141J-681SY	"	"	"
R121	QRD141J-681SY	"	"	"
R122	QRD141J-681SY	"	"	"
R123	QRD141J-680SY	68 Ω	"	"
R124	QRD141J-680SY	"	"	"
R125	QRD141J-680SY	"	"	"
R126	QRD141J-680SY	"	"	"
R127	QRD141J-163SY	16 kΩ	"	"
R128	QRD141J-163SY	"	"	"
R129	QRD141J-271SY	270 Ω	"	"
R130	QRD141J-271SY	"	"	"
R131	QRD141J-682SY	6.8 kΩ	"	"
R132	QRD141J-682SY	"	"	"
R133	QRD141J-184SY	180 kΩ	"	"
R134	QRD141J-184SY	"	"	"
R135	QRD141J-123SY	12 kΩ	"	"
R136	QRD141J-123SY	"	"	"
R137	QRD141J-101SY	100 Ω	"	"
R138	QRD141J-101SY	"	"	"
R139	QRD141J-152SY	1.5 kΩ	"	"
R140	QRD141J-152SY	"	"	"
R141	QRD141J-113SY	11 kΩ	"	"
R142	QRD141J-113SY	"	"	"
R143	QRD141J-361SY	360 Ω	"	"
R144	QRD141J-361SY	"	"	"
R145	QRD141J-102SY	1 kΩ	"	"
R146	QRD141J-102SY	"	"	"
R147	QRD141J-101SY	100 Ω	"	"
R148	QRD141J-101SY	"	"	"
R149	QRD141J-101SY	"	"	"
R150	QRD141J-101SY	"	"	"
R151	QRD141J-224SY	220 kΩ	"	"
R152	QRD141J-224SY	220 kΩ	1/4 W	Carbon
R153	QRD141J-331SY	330 Ω	"	"
R154	QRD141J-331SY	"	"	"
R155	QRD141J-333SY	33 kΩ	"	"
R157	QRG017J-471S	470 Ω	1 W	Oxide Metal Film
R158	QRG017J-471S	"	"	"
R159	QRG017J-471S	"	"	"
R160	QRG017J-471S	"	"	"
R161	QRD141J-220SY	22 Ω	1/4 W	Carbon
R162	QRD141J-220SY	"	"	"
R163	QRD141J-331SY	330 Ω	"	"
R164	QRD141J-331SY	"	"	"
R165	QRD141J-105SY	1 MΩ	"	"
R166	QRD141J-105SY	"	"	"
R167	QRD141J-331SY	330 Ω	"	"
R168	QRD141J-331SY	"	"	"
R169	QRD141J-105SY	1 MΩ	"	"
R170	QRD141J-105SY	"	"	"
R171	QRD7A3M-1F5V	250 kΩ	"	Carbon Balance Volume
R173	QRD141J-472SY	4.7 kΩ	"	Carbon
R174	QRD141J-472SY	"	"	"
R175	QRG027J-332	3.3 kΩ	2 W	Oxide Metal Film
R177	QRD141J-331SY	330 Ω	1/4 W	Carbon
R178	QRD141J-331SY	"	"	"
R181	QRD141J-823SY	82 kΩ	"	"
R182	QRD141J-823SY	"	"	"
R183	QRD141J-103SY	10 kΩ	"	"
R184	QRD141J-103SY	"	"	"
R185	QRD141J-105SY	1 MΩ	"	"
R186	QRD141J-105SY	"	"	"
R187	QRD141J-333SY	33 kΩ	"	"
R188	QRD141J-333SY	"	"	"
R189	QRD141J-203SY	20 kΩ	"	"
R190	QRD141J-203SY	"	"	"
R191	QVZ1221-002	100 kΩ	1/2 W	Carbon Master Volume
R195	QRD141J-334SY	330 kΩ	1/4 W	Carbon
R196	QRD141J-334SY	"	"	"
R197	QRD141J-104SY	100 kΩ	"	"
R198	QRD141J-104SY	"	"	"
R201	QRD141J-475SY	4.7 MΩ	"	"
R202	QRD141J-475SY	"	"	"
R203	QRD141J-112SY	1.1 kΩ	"	"
R204	QRD141J-112SY	"	"	"
R205	QRD141J-823SY	82 kΩ	"	"
R206	QRD141J-823SY	"	"	"
R207	QRD141J-622SY	6.2 kΩ	"	"
R208	QRD141J-622SY	"	"	"
R209	QRD141J-912SY	9.1 kΩ	"	"
R210	QRD141J-912SY	"	"	"

Others

Item No.	Part Number	Rating	Description
TAPE 2	EMN00YV-401A		4P Pin Jack Ass'y Front
	EWS013-011		3P Socket Wire Ass'y
	E10367-001		Printed Circuit Board
	QMV5005-002		2P Plug Ass'y
	QMV5005-003		3P Plug Ass'y
	QMV5005-010		10P Plug Ass'y
AUX	E03591-42D		4P Pin Jack Ass'y
GND	E03763-001		GND Terminal
1 KEY	QSP0210-104		Push Switch (Muting
4 KEY	QSP0241-004		Push Switch (Source
8 KEY	QSP0289-001		Push Switch (Type
PHONO	E03591-42DG		4P Pin Jack Ass'y Gold
TAPE 1	E03591-42D		4P Pin Jack Ass'y
TAPE 2	E03591-42D		4P Pin Jack Ass'y
TAPE 2	E03623-003		DIN Socket (EIAJ S,A,U,P) Type
	EWS013-011		3P Socket Wire Ass'y

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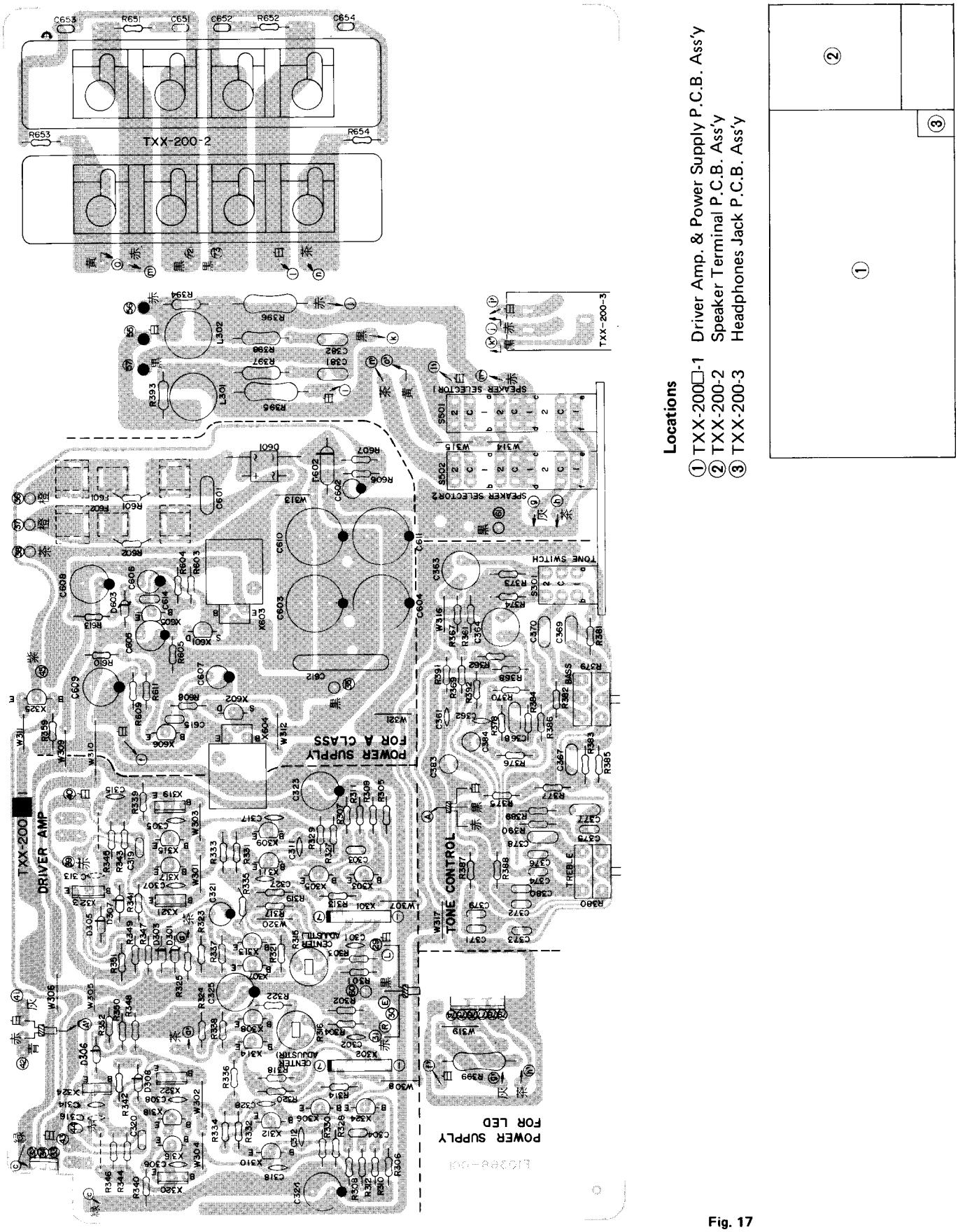
10-(2) TXX-200 B.C. & D Driver Amp. & Power Supply P.C.B. Ass'y

Note: The number of TXX-200 varies according to the areas employed. See page 20.



Locations

① TXX-200□-1 Driver Amp. & Power Supply P.C.B. Ass'y
② TXX-200-2 Speaker Terminal P.C.B. Ass'y
③ TXX-200-3 Headphones Jack P.C.B. Ass'y

Fig. 17

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Transistors

Item No.	Part Number	Rating		Description	
		Pc	fT		Maker
X301	2SK150A(GR,BL)	0.2 W/ unit		Silicon	Toshiba
X302	2SK150A(GR,BL)	"		"	"
X303	2SC458(C)	0.2 W	230 MHz	"	Hitachi
X304	2SC458(C)	"	"	"	"
X305	2SC458(C)	"	"	"	"
X306	2SC458(C)	"	"	"	"
X307	2SC2546(E, F)	0.4 W	90 MHz	"	"
X308	2SC2546(E, F)	"	"	"	"
X309	2SC1775AV(E, F)	0.3 W	200 MHz	"	"
X310	2SC1775AV(E, F)	"	"	"	"
X311	2SC1775AV(E, F)	"	"	"	"
X312	2SC1775AV(E, F)	"	"	"	"
X313	2SC2546(E, F)	0.4 W	90 MHz	"	"
X314	2SC2546(E, F)	"	"	"	"
X315	2SA1029(C, D)	0.2 W	280 MHz	"	"
X316	2SA1029(C, D)	"	"	"	"
X317	2SA1029(C, D)	"	"	"	"
X318	2SA1029(C, D)	"	"	"	"
X319	2SA899(B, V)	1 W	100 MHz	"	Fujithu
X320	2SA899(B, V)	"	"	"	"
X321	2SA899(B, V)	"	"	"	"
X322	2SA899(B, V)	"	"	"	"
X323	2SC1904(B, V)	"	130 MHz	"	"
X324	2SC1904(B, V)	"	"	"	"
X325	2SA1029(C, D)	0.2 W	280 MHz	"	Hitachi
X601	2SK105(F)	0.25 W		"	NEC
X602	2SK105(F)	"		"	"
X603	2SD381(L, M)	20 W	45 MHz	"	"
X604	2SB536(L, M)	"	40 MHz	"	"
X605	2SC1775AV(E, F)	0.3 W	200 MHz	"	Hitachi
X606	2SA872AV(D, E)	"	120 MHz	"	"

Diodes

Item No.	Part Number	Rating	Description	
				Maker
D301	RD5, 6EC		Silicon	JRC
D303	1S2076-31		"	Hitachi
D305	1S2076-31		"	"
D306	1S2076-31		"	"
D307	1S2076-31		"	"
D308	1S2076-31		"	"
D601	ESAB03-02A		"	Fujithu
D602	ERB12-02RKL1		"	"
D603	RD5, 6EC		"	JRC

Coils & Transformers

Item No.	Part Number	Rating	Description
L301	E04059-1R0	1 μH	Coil
L302	E04059-1R0	"	"

Capacitors

Item No.	Part Number	Rating		Description
C301	QCS21HJ-470	47 pF	50 V	Ceramic
C302	QCS21HJ-470	"	"	"
C303	QFP31HJ-821	820 pF	"	Polypropylene
C304	QFP31HJ-821	"	"	"
C305	QCS21HJ-470	47 pF	"	Ceramic
C306	QCS21HJ-470	"	"	"
C307	QCS21HJ-150	15 pF	"	"
C308	QCS21HJ-150	"	"	"
C311	QCS21HJ-220	22 pF	"	"
C312	QCS21HJ-220	"	"	"
C313	QFP31HJ-121	120 pF	"	Polypropylene
C314	QFP31HJ-121	"	"	"
C319	QFM31HJ-332	3300 pF	"	Mylar
C320	QFM31HJ-332	"	"	"
C321	QET51HR-105	1 μF	"	Electrolytic
C323	QET51HR-107	100 μF	"	"
C361	QCS21HJ-120	12 pF	"	Ceramic
C362	QCS21HJ-120	"	"	"
C363	QEZ0046-226	22 μF	"	Electrolytic
C364	QEZ0046-226	"	"	"
C367	QFM31HJ-393	0.039 μF	50 V	Mylar
C368	QFM31HJ-393	"	"	"
C369	QFM31HJ-274	0.27 μF	"	"
C370	QFM31HJ-274	"	"	"
C371	QFM31HJ-272	2700 pF	"	"
C372	QFM31HJ-272	"	"	"
C373	QFP31HJ-181	180 pF	"	Polypropylene
C374	QFP31HJ-181	"	"	"
C375	QFM31HJ-122	1200 pF	"	Mylar
C376	QFM31HJ-122	"	"	"
C377	QFM31HJ-563	0.056 μF	"	"
C378	QFM31HJ-563	"	"	"
C379	QFM31HJ-472	4700 pF	"	"
C380	QFM31HJ-472	"	"	"
C383	QEZ0046-225	2.2 μF	"	Electrolytic
C384	QEZ0046-225	"		"
C601	QFZ0072-223	0.022 μF		Film
C602	QET51HR-474	0.47 μF	50 V	Electrolytic
C603	QET52AR-227E	220 μF	100 V	"
C604	QET52AR-227E	"	"	"
C605	QET51CR-476	47 μF	16 V	"
C606	QET51HR-475	4.7 μF	50 V	"
C607	QET51HR-475	"	"	"
C609	QET51HR-107	100 μF	"	"
C610	QET52AR-227E	220 μF	100 V	"
C611	QET52AR-227E	"	"	"
C612	QFZ0074-225	2.2 μF		Film
C614	QCS21HJ-221	220 pF	50 V	Ceramic
C615	QCS21HJ-221	"	"	"
C651	QFM31HJ-103	0.01 μF	"	Mylar
C652	QFM31HJ-103	"	"	"
C653	QFM31HJ-103	"	"	"
C654	QFM31HJ-103	"	"	"

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Resistors

Item No.	Part Number	Rating		Description
R301	QRD141J-224SY	220 kΩ	1/4 W	Carbon
R302	QRD141J-224SY	"	"	"
R303	QRD141J-470SY	47 Ω	"	"
R304	QRD141J-470SY	"	"	"
R305	QRD141J-822SY	8.2 kΩ	"	"
R306	QRD141J-822SY	"	"	"
R307	QRD141J-822SY	"	"	"
R308	QRD141J-822SY	"	"	"
R309	QRD141J-154SY	150 kΩ	"	"
R310	QRD141J-154SY	"	"	"
R311	QRD141J-471SY	470 Ω	"	"
R312	QRD141J-471SY	"	"	"
R313	QRD141J-393SY	39 kΩ	"	"
R314	QRD141J-393SY	"	"	"
R315	QVP4A0B-101	100 Ω	"	"
R316	QVP4A0B-101	"	"	"
R317	QRD141J-150SY	15 Ω	"	"
R318	QRD141J-150SY	"	"	"
R319	QRD141J-150SY	"	"	"
R320	QRD141J-150SY	"	"	"
R321	QRD141J-272SY	2.7 kΩ	"	"
R322	QRD141J-272SY	"	"	"
R323	QRD141J-152SY	1.5 kΩ	"	"
R324	QRD141J-152SY	"	"	"
R325	QRD141J-183SY	18 kΩ	"	"
R327	QRD149J-102S	1 kΩ	"	"
R328	QRD149J-102S	"	"	"
R329	QRD149J-102S	"	"	"
R330	QRD149J-102S	"	"	"
R331	QRD141J-220SY	22 Ω	"	"
R332	QRD141J-220SY	"	"	"
R333	QRD141J-220SY	"	"	"
R334	QRD141J-220SY	"	"	"
R335	QRD141J-682SY	6.8 kΩ	"	"
R336	QRD141J-682SY	"	"	"
R337	QRD141J-152SY	1.5 kΩ	"	"
R338	QRD141J-152SY	"	"	"
R339	QRD149J-680S	68 Ω	"	"
R340	QRD149J-680S	"	"	"
R341	QRD149J-561S	560 Ω	"	"
R342	QRD149J-561S	"	"	"
R343	QRD141J-822SY	8.2 kΩ	"	"
R344	QRD141J-822SY	"	"	"
R345	QRD141J-822SY	"	"	"
R346	QRD141J-822SY	"	"	"
R347	QRD141J-153SY	15 kΩ	"	"
R348	QRD141J-153SY	"	"	"
R349	QRD141J-221SY	220 Ω	"	"
R350	QRD141J-221SY	"	"	"
R351	QRD141J-221SY	"	"	"
R352	QRD141J-221SY	"	"	"
R359	QRD141J-102SY	1 kΩ	"	"
R361	QRD141J-391SY	390 Ω	"	"
R362	QRD141J-391SY	"	"	"
R367	QRD141J-622SY	6.2 kΩ	"	"
R368	QRD141J-622SY	"	"	"
R369	QRD141J-393SY	39 kΩ	"	"
R370	QRD141J-393SY	"	"	"
R373	QRD141J-563SY	56 kΩ	"	"
R374	QRD141J-563SY	"	"	"
R375	QRD141J-471SY	470 Ω	"	"
R376	QRD141J-471SY	"	"	"
R377	QRD141J-822SY	8.2 kΩ	"	"
R378	QRD141J-822SY	"	"	"
R379	QVZ1709-007	50 kΩ	"	Variable (Carbon) Bass
R380	QVZ1709-008	50 kΩ	1/4 W	Variable (Carbon) Treble
R381	QRD141J-132SY	1.3 kΩ	"	Carbon
R382	QRD141J-132SY	"	"	"
R383	QRD141J-914SY	910 kΩ	"	"
R384	QRD141J-914SY	"	"	"
R385	QRD141J-620SY	62 Ω	"	"
R386	QRD141J-620SY	"	"	"
R387	QRD141J-202SY	2 kΩ	"	"
R388	QRD141J-202SY	"	"	"
R389	QRD141J-301SY	300 Ω	"	"
R390	QRD141J-301SY	"	"	"
R391	QRD141J-682SY	6.8 kΩ	"	"
R392	QRD141J-682SY	"	"	"
R393	QRD129J-120	12 Ω	1/2 W	"
R394	QRD129J-120	"	"	"
R395	QRG027J-331	330 Ω	2 W	Oxide Metal Film
R396	QRG017J-331	"	"	"
R399	QRG027J-272	2.7 kΩ	"	"
R601	QRD149J-3R3S	3.3 Ω	1/4 W	Carbon
R601	QRD149J-3R3S	"	"	"
R602	QRD149J-3R3S	"	"	"
R602	QRD149J-3R3S	"	"	"
R603	QRD141J-563SY	56 kΩ	"	"
R604	QRD141J-124SY	120 kΩ	"	"
R605	QRD141J-622SY	6.2 kΩ	"	"
R606	QRD141J-223SY	22 kΩ	"	"
R607	QRD141J-103SY	10 kΩ	"	"
R608	QRD141J-332SY	3.3 kΩ	"	"
R609	QRD141J-563SY	56 kΩ	"	"
R610	QRD141J-152SY	1.5 kΩ	"	"
R611	QRD141J-563SY	56 kΩ	"	"
R613	QRD141J-153SY	15 kΩ	"	"
R651	QRD149J-100S	10 Ω	"	Carbon (J), (C), (U), (P) Type
R651	QRZ0052-100	"	"	Fuse (E), (BS), (A) Type
R652	QRD149J-100S	"	"	Carbon (J), (C), (U), (P) Type
R652	QRZ0052-100	"	"	Fuse (E), (BS), (A) Type
R653	QRD149J-100S	"	"	Carbon (J), (C), (U), (P) Type
R653	QRZ0052-100	"	"	Fuse (E), (BS), (A) Type
R654	QRD149J-100S	"	"	Carbon (J), (C), (U), (P) Type
R654	QRZ0052-100	"	"	Fuse (E), (BS), (A) Type

Others

Item No.	Part Number	Rating	Description
	E03572-011		Speaker Terminal
	E10368-001		Printed Circuit Board
	E45524-002		Fuse Clip (C) Type
	E48965-002		Fuse Clip (E), (BS), (A) Type
	E61537-001		Heat Sink
	QMS6302-105		Head Phone Jack Ass'y
	QMV5009-003		3P Plug Ass'y
	QMV5009-006		6P Plug Ass'y
SPK	QSP0249-003		Push Switch
3P	EWS013-010		3P Socket Wire Ass'y TO: TPS-280
3P	EWS013-013		3P Socket Wire Ass'y TO: VOLUME
4P	EWS014-007		4P Socket Wire Ass'y TO: TPS-280

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10-(3) TPS-280 B.C.D. & E Power Amp. & Protector P.C.B. Ass'y

Note: The number of TPS-280 varies according to the areas employed. See page 20.

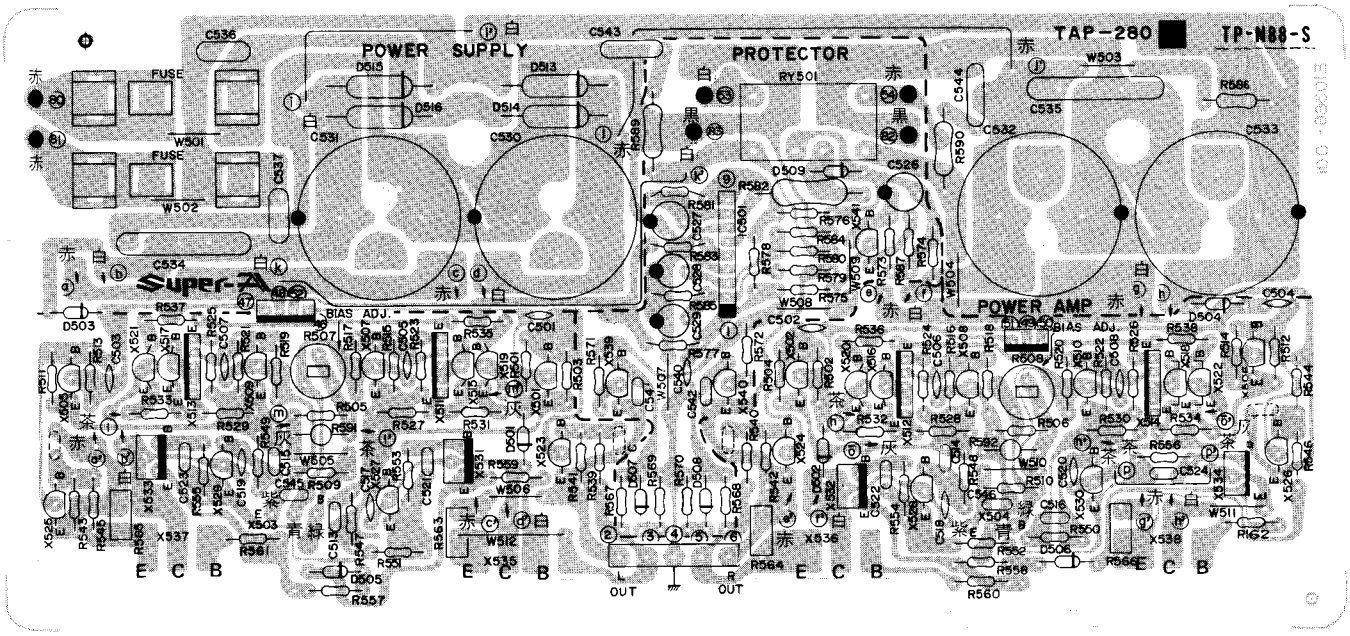

Fig. 18

Transistors

Item No.	Part Number	Rating		Description	
		Pc	fT		Maker
X501	2SC458(C, D)	0.2 W	230 MHz	Silicon	Hitachi
X502	2SC458(C, D)	"	"	"	"
X503	2SC1568(R)	4 W	150 MHz	"	Matsushita
X504	2SC1568(R)	"	"	"	"
X505	2SA1029(C, D)	0.2 W	280 MHz	"	Hitachi
X506	2SA1029(C, D)	"	"	"	"
X507	2SA1029(C, D)	"	"	"	"
X508	2SA1029(C, D)	"	"	"	"
X509	2SC458(C, D)	"	230 MHz	"	"
X510	2SC458(C, D)	"	"	"	"
X511	2SA995(F, G)	0.2 W/ unit	100 MHz	"	Mitsubishi
X512	2SA995(F, G)	"	"	"	"
X513	2SC2291(F, G)	"	"	"	"
X514	2SC2291(F, G)	"	"	"	"
X515	2SC458(C, D)	0.2 W	230 MHz	"	Hitachi
X516	2SC458(C, D)	"	"	"	"
X517	2SA1029(C, D)	"	280 MHz	"	"
X518	2SA1029(C, D)	"	"	"	"
X519	2SA1029(C, D)	"	"	"	"
X520	2SA1029(C, D)	"	"	"	"
X521	2SC458(C, D)	"	230 MHz	"	"
X522	2SC458(C, D)	"	"	"	"
X523	2SC458(C, D)	"	"	"	"
X524	2SC458(C, D)	"	"	"	"
X525	2SA1029(C, D)	"	"	"	"
X526	2SA1029(C, D)	"	"	"	"
X527	2SC1775AV(E)	0.3 W	200 MHz	"	"
X528	2SC1775AV(E)	"	"	"	"
X529	2SA872AV(E)	"	120 MHz	"	"
X530	2SA872AV(E)	"	"	"	"
X531	2SD381(L, M)	20 W	45 MHz	"	NEC
X532	2SD381(L, M)	"	"	"	"
X533	2SB536(L, M)	"	40 MHz	"	"
X534	2SB536(L, M)	"	"	"	"

Item No.	Part Number	Rating		Description	
		Pc	fT		Maker
X535	2SC2525L(G, B)	120 W	80 MHz	Silicor	Fujithu
X536	2SC2525L(G, B)	"	"	"	"
X537	2SA1075L(G, B)	"	60 MHz	"	"
X538	2SA1075L(G, B)	"	"	"	"
X539	2SC1775AV(E, F)	0.3 W	200 MHz	"	Hitachi
X540	2SC1775AV(E, F)	"	"	"	"
X541	2SA872AV(D, E)	"	120 MHz	"	"

Integrated Circuits

Item No.	Part Number	Rating		Description
		Pc		Maker
IC501	TA7317P	0.5 W	I.C.	Toshiba

Diodes

Item No.	Part Number	Rating	Description	
				Maker
D501	1SS81		Silicon	Hitachi
D502	1SS81		"	"
D503	1SS81		"	"
D504	1SS81		"	"
D505	1S2076-31		"	"
D506	1S2076-31		"	"
D507	1S2076-31		"	"
D508	1S2076-31		"	"
D509	1S2076-31		"	"
D513	ERC04-02AL		"	Fujithu
D514	ERC04-02AL		"	"
D515	ERC04-02AL		"	"
D516	ERC04-02AL		"	"

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Resistors

Item No.	Part Number	Rating		Description
R501	QRD141J-682SY	6.8 kΩ	1/4 W	Carbon
R502	QRD141J-682SY	"	"	"
R503	QRD141J-472SY	4.7 kΩ	"	"
R504	QRD141J-472SY	"	"	"
R505	QRD141J-471SY	470 Ω	"	"
R506	QRD141J-471SY	"	"	"
R507	QVP4A0B-221	220 Ω	0.15 W	"
R508	QVP4A0B-221	"	"	"
R509	QRD141J-391SY	390 Ω	1/4 W	"
R510	QRD141J-391SY	"	"	"
R511	QRD141J-472SY	4.7 kΩ	"	"
R512	QRD141J-472SY	"	"	"
R513	QRD141J-682SY	6.8 kΩ	"	"
R514	QRD141J-682SY	"	"	"
R515	QRD148J-182S	1.8 kΩ	"	"
R516	QRD148J-182S	"	"	"
R517	QRD141J-102SY	1 kΩ	"	"
R518	QRD141J-102SY	"	"	"
R519	QRD141J-102SY	"	"	"
R520	QRD141J-102SY	"	"	"
R521	QRD148J-182S	1.8 kΩ	"	"
R522	QRD148J-182S	"	"	"
R523	QRD148J-560S	56 Ω	"	"
R524	QRD148J-560S	"	"	"
R525	QRD148J-560S	"	"	"
R526	QRD148J-560S	"	"	"
R527	QRD141J-560SY	"	"	"
R528	QRD141J-560SY	"	"	"
R529	QRD141J-560SY	"	"	"
R530	QRD141J-560SY	"	"	"
R531	QRD141J-911SY	910 Ω	"	"
R532	QRD141J-911SY	"	"	"
R533	QRD141J-911SY	"	"	"
R534	QRD141J-911SY	"	"	"
R535	QRD141J-221SY	220 Ω	"	"
R536	QRD141J-221SY	"	"	"
R537	QRD141J-221SY	"	"	"
R538	QRD141J-221SY	"	"	"
R539	QRD141J-511SY	510 Ω	"	"
R540	QRD141J-511SY	"	"	"
R541	QRD141J-391SY	390 Ω	"	"
R542	QRD141J-391SY	"	"	"
R543	QRD141J-391SY	"	"	"
R544	QRD141J-391SY	"	"	"
R545	QRD141J-511SY	510 Ω	"	"
R546	QRD141J-511SY	"	"	"
R547	QRD149J-681S	680 Ω	"	"
R548	QRD149J-681S	"	"	"
R549	QRD149J-681S	"	"	"
R550	QRD149J-681S	"	"	"
R551	QRD149J-122S	1.2 kΩ	"	"
R552	QRD149J-122S	"	"	"
R553	QRD149J-181S	180 Ω	"	"
R554	QRD149J-181S	"	"	"
R555	QRD149J-181S	"	"	"
R556	QRD149J-181S	"	"	"
R557	QRD149J-820S	82 Ω	"	"
R558	QRD149J-820S	"	"	"
R559	QRD141J-5R6SY	5.6 Ω	"	"
R560	QRD141J-5R6SY	"	"	"
R561	QRD141J-5R6SY	"	"	"
R562	QRD141J-5R6SY	"	"	"
R563	QRM054K-R22	0.22 Ω	5 W	Metal Plate
R564	QRM054K-R22	"	"	"
R565	QRM054K-R22	"	"	"
R566	QRM054K-R22	"	"	"
R567	QRD141J-222SY	2.2 kΩ	1/4 W	Carbon
R568	QRD141J-222SY	"	"	"
R569	QRD141J-183SY	18 kΩ	"	"
R570	QRD141J-183SY	"	"	"
R571	QRD141J-123SY	12 kΩ	1/4 W	Carbon
R572	QRD141J-123SY	"	"	"
R573	QRD141J-103SY	10 kΩ	"	"
R574	QRD149J-270S	27 Ω	"	"
R575	QRD141J-473SY	47 kΩ	"	"
R576	QRD141J-183SY	18 kΩ	"	"
R577	QRD141J-683SY	68 kΩ	"	"
R578	QRD141J-124SY	120 kΩ	"	"
R579	QRD141J-563SY	56 kΩ	"	"
R580	QRD141J-563SY	"	"	"
R581	QRD141J-334SY	330 kΩ	"	"
R582	QRG027J-102	1 kΩ	2 W	Oxide Metal Film
R583	QRD141J-332SY	3.3 kΩ	1/4 W	Carbon
R584	QRD141J-273SY	27 kΩ	"	"
R585	QRD141J-273SY	"	"	"
R586	QRG129J-563	56 kΩ	1/2 W	Oxide Metal Film
R587	QRD141J-332SY	3.3 kΩ	1/4 W	Carbon
R589	QRX017J-100S	10 Ω	1 W	Oxide Metal Film (J, C, U, P)
R589	QRZ0049-100	"	"	Fuse (E,BS,A) Type
R590	QRX017J-100S	"	1 W	Oxide Metal Film (J, C, U, P)
R590	QRZ0049-100	"	"	Fuse (E,BS,A) Type
R591	SDT35	350 Ω	"	Termstor
R592	SDT35	"	"	"

Capacitors

Item No.	Part Number	Rating		Description
C501	QCS21HJ-221	220 pF	50 V	Ceramic
C502	QCS21HJ-221	"	"	"
C503	QCS21HJ-221	"	"	"
C504	QCS21HJ-221	"	"	"
C505	QCS21HJ-100	10 pF	"	"
C506	QCS21HJ-100	"	"	"
C507	QCS21HJ-100	"	"	"
C508	QCS21HJ-100	"	"	"
C513	QCS21HJ-221	220 pF	"	"
C514	QCS21HJ-221	"	"	"
C515	QCS21HJ-221	"	"	"
C516	QCS21HJ-221	"	"	"
C517	QCS22HJ-220	22 pF	500 V	"
C518	QCS22HJ-220	"	"	"
C519	QCS22HJ-220	"	"	"
C520	QCS22HJ-220	"	"	"
C521	QFM31HJ-102	1000 pF	50 V	Mylar
C522	QFM31HJ-102	"	"	"
C523	QCS21HJ-471	470 pF	"	Ceramic
C524	QCS21HJ-471	"	"	"
C526	QET51CR-226	22 μF	16 V	Electrolytic
C527	QET51CR-226	"	"	"
C528	QET51AR-476	47 μF	10 V	"
C529	QET51AR-476	"	"	"
C530	EEZ0057-688H	6800 μF	56 V	Electrolytic
C531	EEZ0057-688H	"	"	"
C532	EEZ0057-688H	"	"	"
C533	EEZ0057-688H	"	"	"
C534	QFZ0080-225	2.2 μF		Film
C535	QFZ0080-225	"		"

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Item No.	Part Number		Rating	Description
C536	QCE22HP-103	0.01 μF	500 V	Ceramic (J),(C) Type
C536	QFZ0074-104	0.1 μF		Film (E),(BS),(A), (U),(P) Type
C537	QCE22HP-103	0.01 μF	500 V	
C540	QCS21HJ-101	100 pF	50 V	Ceramic
C541	QFM31HJ-333	0.033 μF	"	Mylar
C542	QFM31HJ-333	"	"	"
C543	QFZ0075-473	0.047 μF	"	Film
C544	QFZ0075-473	"	"	"
C545	QFM31HJ-103	0.01 μF	50 V	Mylar
C546	QFM31HJ-103	"	"	"

Others

Item No.	Part Number	Rating	Description
	EWS013-012		Socket Wire Ass'y for X503, X504
	E10366-001		Printed Circuit Board
	E300209-001		Heat Sink
	E45524-002		Fuse Clip (C) Type
	E48965-002		Fuse Clip (E), (BS), (A) Type
RIGHT	QMV5005-003		3P Plug Ass'y
LEFT	QMV5005-004		4P Plug Ass'y
RY501	ESK6D24-212		Relay Switch
T. Point	E03628-5UD		5P Plug
	E65468-005		Heat Sink Bracket

10-(4) TPS-214E Fuse & AC Outlet P.C.B. Ass'y

[Employed only on (J) & (C) types]

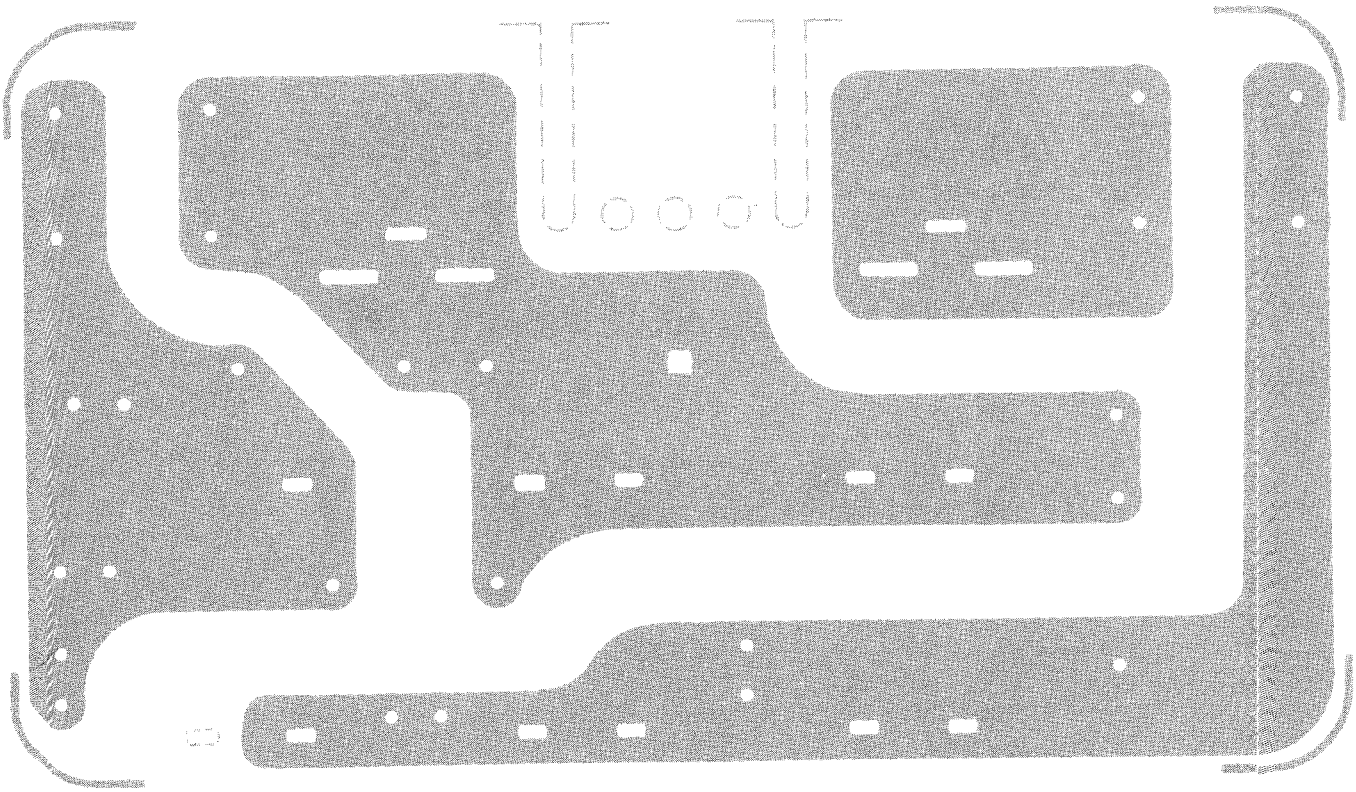

Fig. 19

Capacitors

Item No.	Part Number	Rating	Description
C001	QCZ9014-103	0.01 μF AC 125 V	Ceramic

Others

Item No.	Part Number	Rating	Description
	E03675-004		Fuse Clip
	E66003-001		Cir. Board
	QMC0637-003		AC Socket

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10-(5) TPS-194A AC Outlet & Voltage Selector P.C.B. Ass'y

[Employed only on (U) & (P) types]

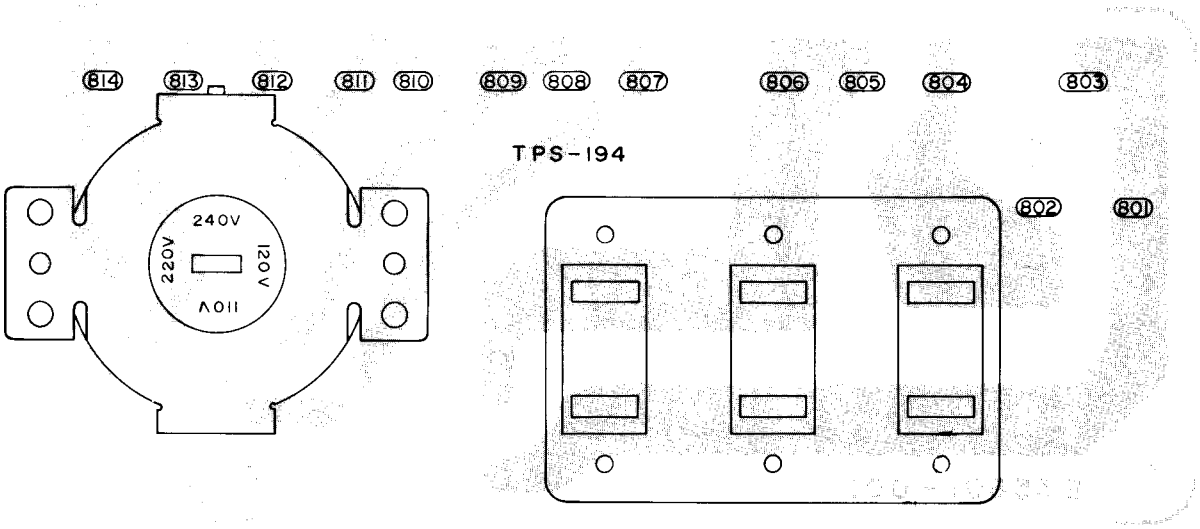

Fig. 20

Capacitors

Item No.	Part Number	Rating	Description
C801	QFH53BM-103	0.01 μF 1250 V	Metallized Mylar
C802	QFH53BM-103	" "	"

Others

Item No.	Part Number	Rating	Description
	E35601-001		Cir. Board
	QMC0637-002		AC Socket
	QSR0085-001		V. Selector

10-(6) TPS-197A & BBS Line Voltage Selector P.C.B. Ass'y

[Employed only on (E), (A) and (BS) types]

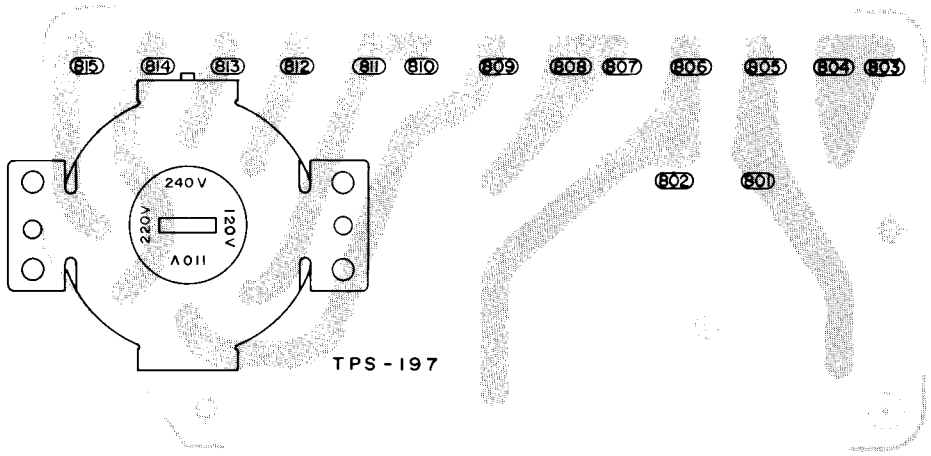

Fig. 21

Capacitors

Item No.	Part Number	Rating	Description
C801	QFZ9007-103	0.01 μF AC 450 V	Film(TPS-197A)
C801	QFZ9007-103BS	" "	"
			" (TPS-197BBS)
C803	QFZ9007-103	" "	" (TPS-197A)
C803	QFZ9007-103BS	" "	"
			(TPS-197BBS)

Others

Item No.	Part Number	Rating	Description
	E35619-002		Cir. Board (TPS-197A)
	E35619-002BS		" (TPS-197BBS)
	E65586-001		Bracket
	QSR0085-001		V. Selector(TPS-197A)
	QSR0085-001BS		" (TPS-197BBS)

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11. Packing Materials and Part Numbers

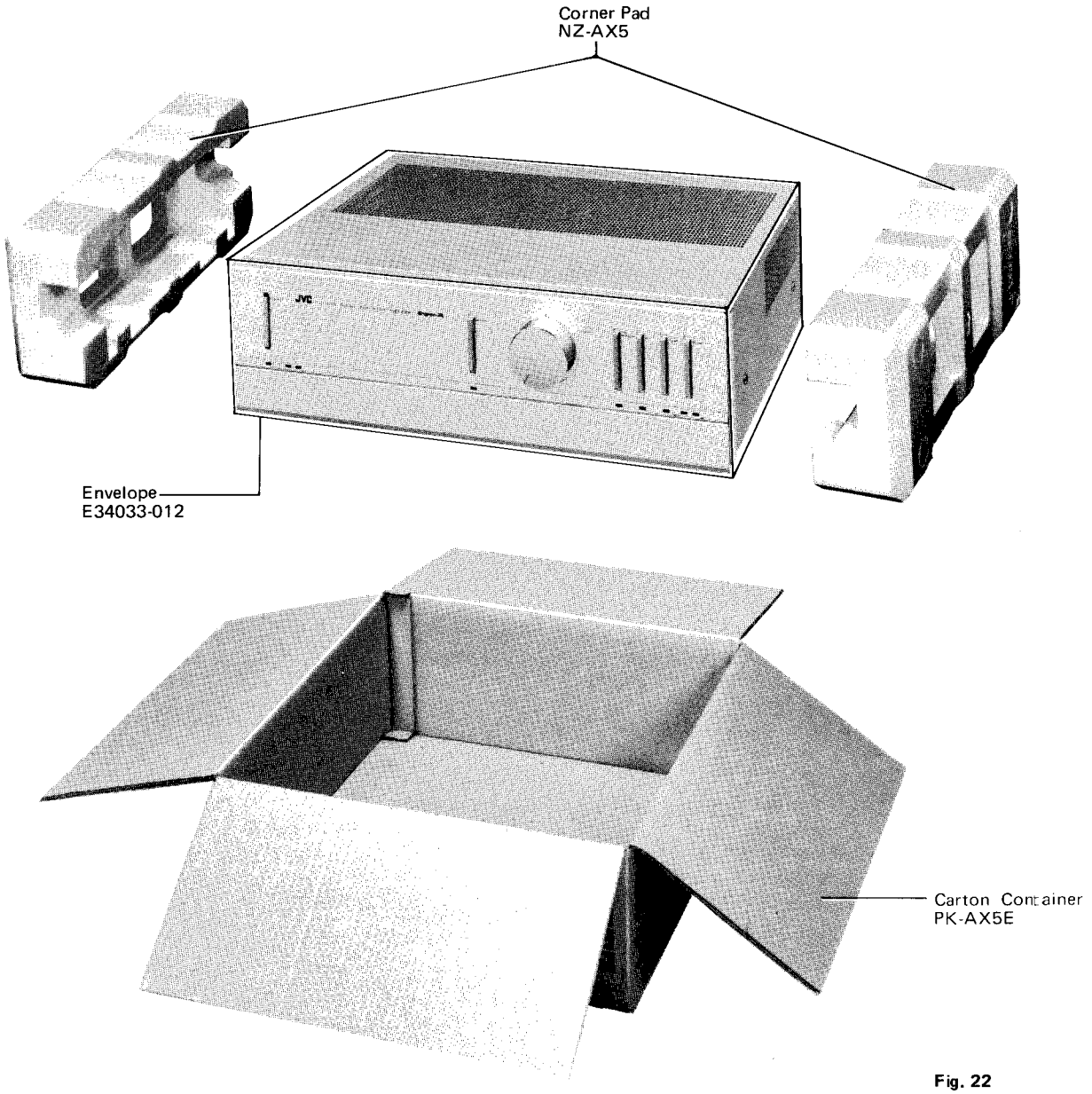

Fig. 22

12. Accessories List

Item No.	Part Number	Description	Q'ty
1	E30580-735A	Instruction Book	1
2	See below	Warranty Card	1
3	E64207-002	Envelope for Instruction Book and Warranty Card	1
4	BT20024B	"Do It Better" (for U.S.A. only)	1
5	BT20023	Service Procedures (for U.S.A. only)	1
6	QMF51A2-5ROS or QMF51A2-2R5L (See page 20.)	Fuse (for U.S. Military Market and Others) ⚠	1
7	E64208-001	Envelope for Fuses (for U.S. Military Market and Others)	1
8	E66188-026 (2.5AT) or 027 (5AT)	Fuse Label (U.S. Military Market and Others)	1
9	E64216-002	Caution Tag (with Power Cord for Military Market only)	1

NOTE: ⚠ SAFETY PARTS

Warranty Card

U.S.A.	Canada	U.S. Military Market	Europe	Australia	U.K.
BT20032B	BT20025C	BT20032B	–	BT20029B	BT20013B

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13. Parts List with Specified Numbers for Designated Areas

Page	Item No.	Description	U.S.A.	Canada	U.S. Military Market & Other Countries	Europe	Australia	U.K.
5	5	Power Switch ⚠	QSP1110-301	QSP1110-301	QSP0020-002	QSP0020-002	QSP0020-002	QSP0020-002BS
		Power Cord ⚠	QMP1200-200	QMP1200-200	QMP7600-250	QMP3900-200	QMP2560-244	QMP9017-008BS
		Cord Stopper ⚠	QHS3876-162	QHS3876-162	QHS3876-162	QHS3876-162	QHS3876-162	QHS3876-162BS
5	5	Power Transformer ⚠	E03077-42B	E03077-42B	E03077-42C	E03077-42C	E03077-42C	E03077-42CBS
		Fuse ⚠ (Primary) (F701)	QMF61U1-5R0	QMF61U1-5R0	QMF51A2-5R0S or QMF51A2-2R5L	QMF51A2-2R5L	QMF51A2-2R5L	QMF51A2-2R5LBS
		(Secondary) (F501, F502)	–	QMF61U1-8R0	–	QMF51A2-6R3S	QMF51A2-6R3S	QMF51A2-6R3SBS
		(F601, F602)	–	QMF61U1-R50	–	QMF51A2-R50L	QMF51A2-R50L	QMF51A2-R50LBS
		AC Outlet ⚠	QMC0637-003	QMC0637-003	QMC0637-002	–	–	–
		Voltage Selector ⚠	–	–	QSR0085-001	QSR0085-001	QSR0085-001	QSR0085-001BS
		Rear Panel	E23090-002	E23090-002	E23090-003	E23090-003	E23090-003	E23090-003
17	10-(4)	Fuse P.C.B. Ass'y ⚠	TPS-214E	TPS-214E	–	–	–	–
18	10-(5)	Line Voltage	–	–	TPS-194A	TPS-197A	TPS-197A	TPS-197BBS
18	10-(6)	Selector P.C.B. Ass'y ⚠						
10	10-(1)	EQ & SW P.C.B. Ass'y	TXX-199B	TXX-199B	TXX-199C	TXX-199C	TXX-199C	TXX-199C
12	10-(2)	Driver Amp. P.C.B. Ass'y	TXX-200D	TXX-200B	TXX-200D	TXX-200C	TXX-200C	TXX-200C
15	10-(3)	Power Amp. P.C.B. Ass'y	TPS-280B	TPS-280C	TPS-280E	TPS-280D	TPS-280D	TPS-280D
		Mask Plate	–	–	–	E65494-001	E65494-001	E65494-001

Note: ⚠ SAFETY PARTS

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14. A-X5 Schematic Diagram (for U.S.A.)

Printed Circuit Board Ass'y Locations

P.C. Board Ass'y	Description	Page
TXX-199 B & C	Equalizer Amp. & Switch P.C. B. Ass'y	10
TXX-200 B.C. & D	Driver Amp. & Power Supply P.C.B. Ass'y	12
TPS-280 B.C.D & E	Power Amp. & Protector P.C.B. Ass'y	15
TPS-214E	Fuse & AC Outlet P.C.B. Ass'y	17
TPS-194A	AC Outlet & Voltage Selector P.C.B. Ass'y	18
TPS-197A & BBS	Line Voltage Selector P.C.B. Ass'y	18

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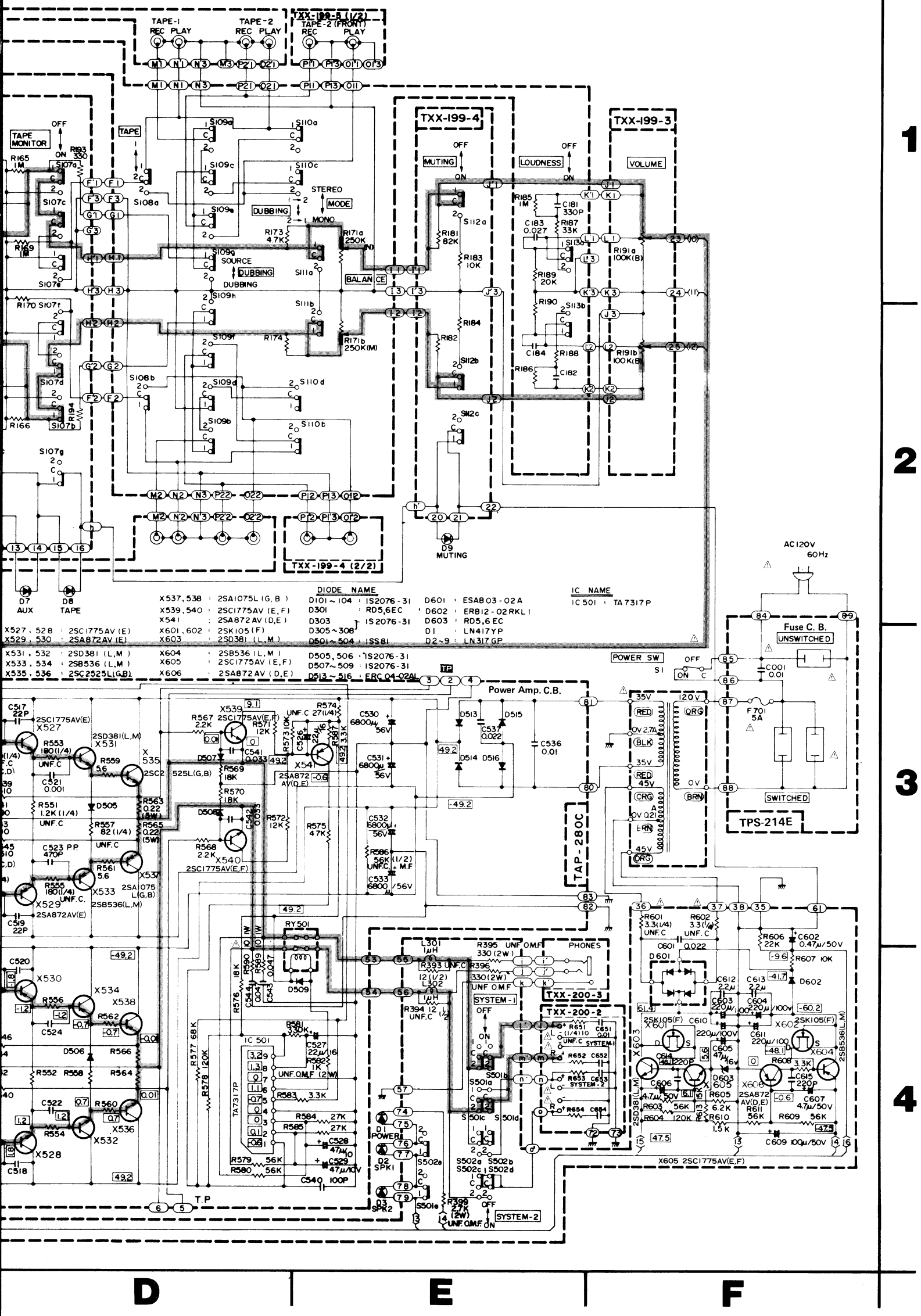

How to utilize the circuit diagram

1. —— indicates positive B power supply.
2. —— indicates negative B power supply.
3. ▒▒ indicates the signal path.
4. Voltage values measured with a tester (impedance 20 kΩ/V) in mode of "no signal" are indicated as below:
   Example: 0.3 (unit:V)
   -9.0 (unit : V)
5. Transistor numbers and voltage values, are identical for both left and right channels, therefore, they are indicated only on one side.
6. When replacing the ⚠ marked parts, be sure to use the designated parts to ensure safety.
7. Resistors are indicated as follows;
   - Unit No indication : Ω
     K : kΩ
     M : MΩ
     W : watt
   - Deviation No indication : ±5 %
     J : ±5 %
     K : ±10 %
   - Type No indication : Carbon resistor
8. Capacitors are indicated as follows;
   - Unit No indication : μF
     μ : μF
     P : pF
9. This is the standard circuit diagram. The design and constants are subject to change without notice.

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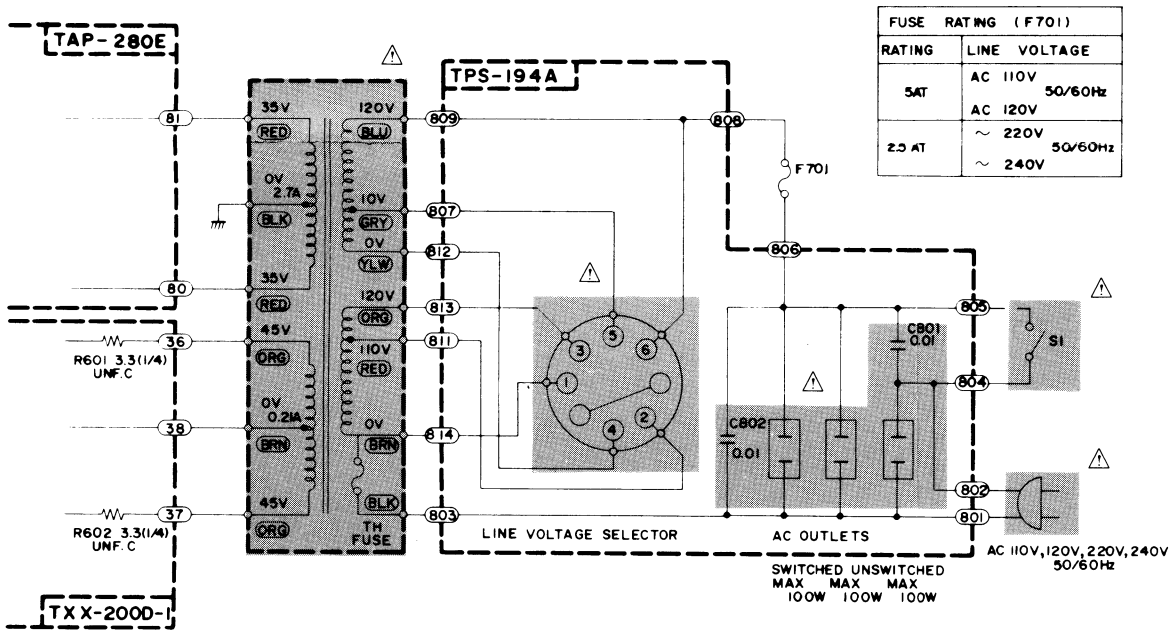
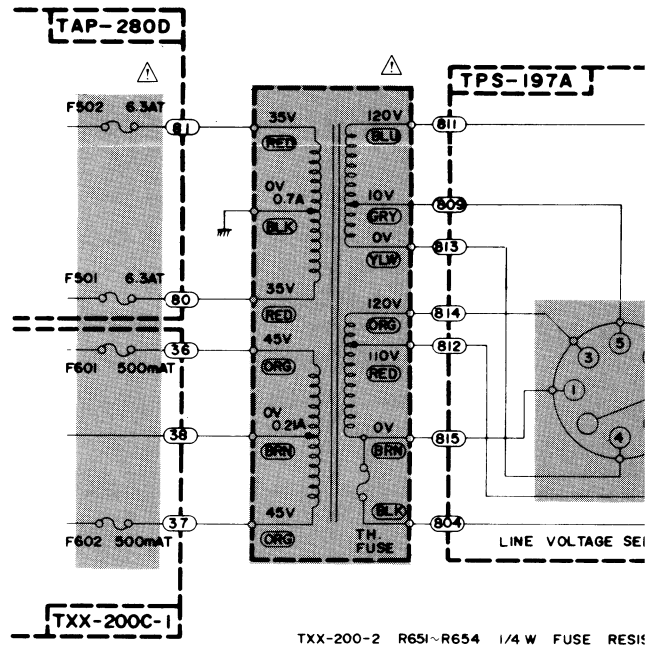
(U),(P) (U) FOR OTHER COUNTRIES
(P) FOR PACEX



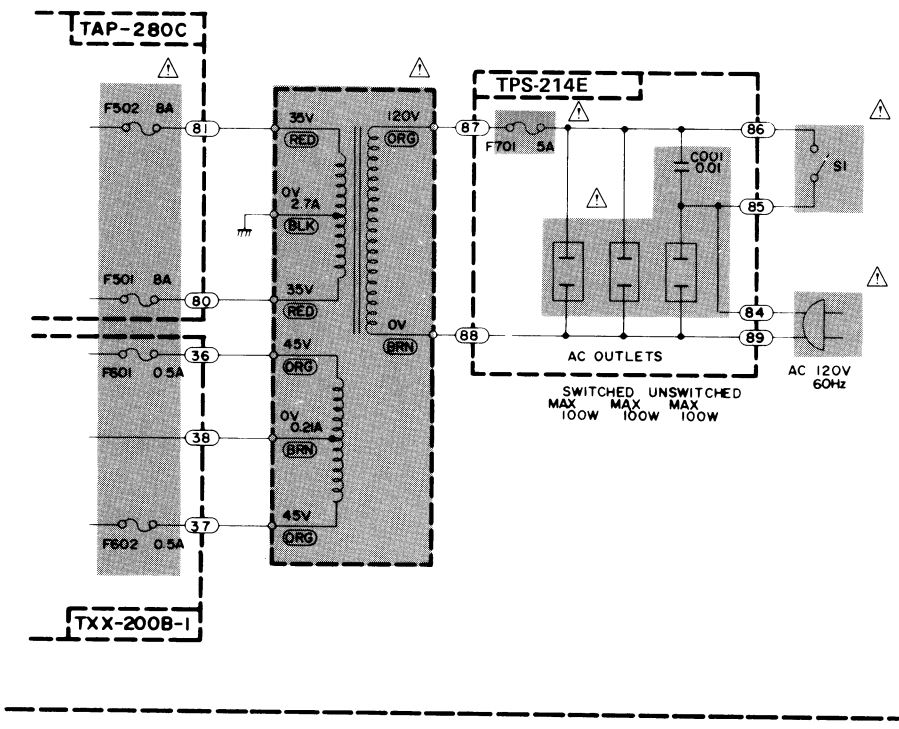
FUSE RATING (F701)	
RATING	LINE VOLTAGE
5AT	AC 110V 50/60Hz AC 120V
2.5 AT	~ 220V 50/60Hz ~ 240V

(E),(A),(BS) (E) FOR EUROPE : ~220V
(A) FOR AUSTRALIA : ~240V
(BS) FOR U.K. : ~240V

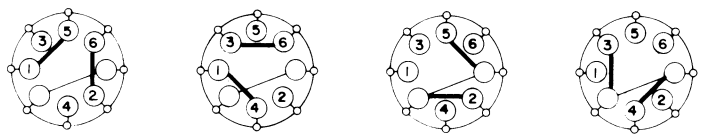


TXX-200-2 R651~R654 1/4 W FUSE RESIS
TAP-280D R589,R590 1W FUSE RESIS

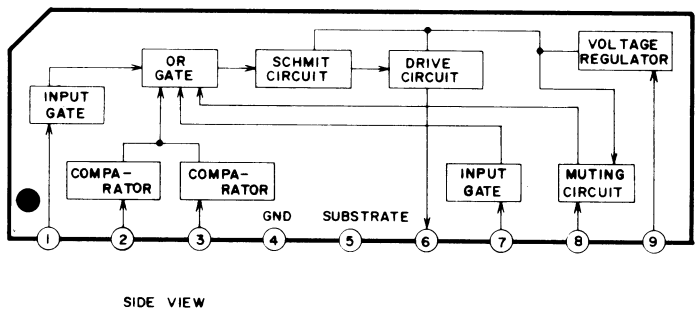
(C) FOR CANADA : AC 120V 60Hz



VOLTAGE SELECTOR CONNECTION



PROTECTOR IC IC501 TA7317P



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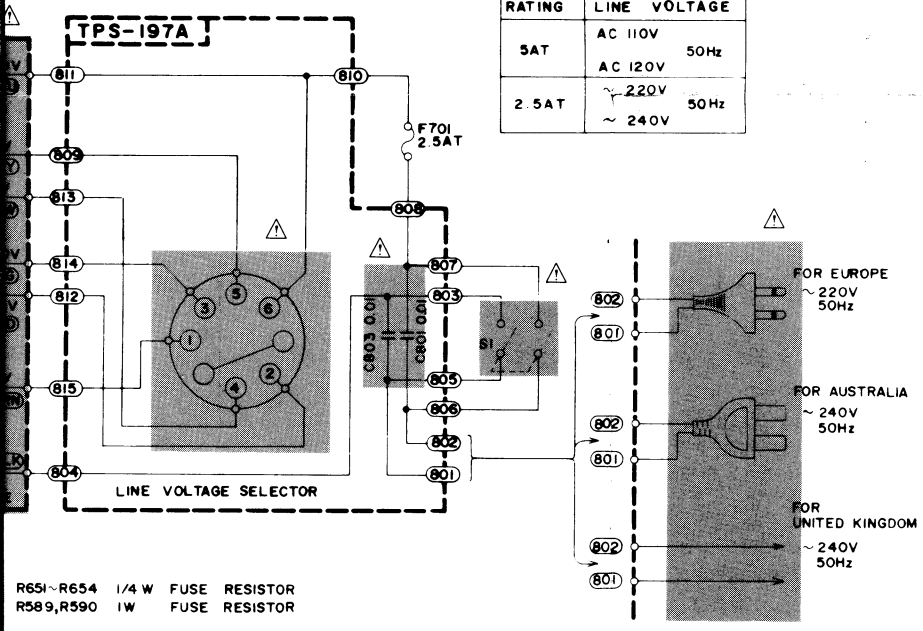
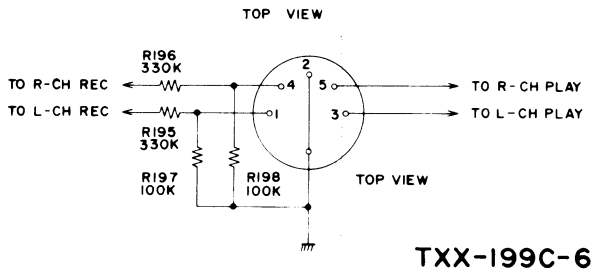
ROPE : ~220V,50Hz
STRALIA : ~240V,50Hz
. : ~240V,50Hz

FUSE RATING (F701)	
RATING	LINE VOLTAGE
5AT	AC 110V / AC 120V 50Hz
2.5AT	~220V / ~240V 50Hz



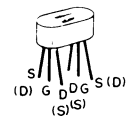
R651~R654 1/4 W FUSE RESISTOR
R589,R590 1W FUSE RESISTOR

DIN CONNECTOR

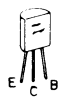


TXX-199C-6

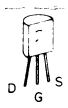
ATTACHED TO (E),(A),(BS),(U),(P),TYPE MODEL



2SK146



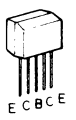
2SC458(C,D)
2SA1029(C,D)
2SC1775AV(E,F)
2SC1775AV(E)
2SA872AV(D,E)
2SC2546(E,F)
2SC2546(E)
2SA1084(E)
2SB560(D,E)



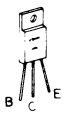
2SK68A (M)
2SK105(F)

2SK105A (BL,GR)

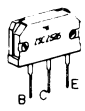
2SC1904(B,V)
2SA899(B,V)
2SC1568(R)



2SC2291(F,G)
2SA995(F,G)



2SD381(L,M)
2SB536(L,M)



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2SA1075L(G,B)

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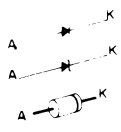

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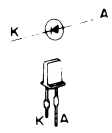

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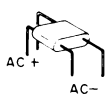

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